

SERVICE MANUAL

PARTS LIST



AKAI STEREO TAPE RECORDER

MODEL **1731W**

ALSO APPLICABLE TO MODEL 1731L, 1731D



STEREO TAPE RECORDER

MODEL 1731W

ALSO APPLICABLE TO MODEL 1731L STEREO TAPE
RECORDER AND 1731D STEREO TAPE DECK

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SECTION 1

SERVICE MANUAL

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I. SPECIFICATIONS

An asterisk next to a figure indicates the minimum guaranteed performance.

TRACK SYSTEM		4-track 2-channel stereo/monaural system
REEL CAPACITY		Up to 7" reel
TAPE SPEED		7-1/2 and 3-3/4 ips $\pm 1\%$ (* $\pm 1.5\%$)
WOW AND FLUTTER		Less than 0.12% (*0.15%) RMS at 7-1/2 ips Less than 0.15% (*0.2%) RMS at 3-3/4 ips
FREQUENCY RESPONSE	AKAI SRT Tape	30 to 24,000 Hz (*40 to 24,000 Hz) ± 3 dB at 7-1/2 ips 30 to 16,000 Hz (*40 to 15,000 Hz) ± 3 dB at 3-3/4 ips
	Regular Tape	30 to 22,000 Hz (*40 to 22,000 Hz) ± 3 dB at 7-1/2 ips 30 to 15,000 Hz (*40 to 14,000 Hz) ± 3 dB at 3-3/4 ips
SIGNAL TO NOISE RATIO		Better than 50 dB (*48 dB) at 7-1/2 ips Batter than 47 dB at 3-3/4 ips
HUM AND NOISE		Less than 5 mV at minimum volume
DISTORTION		Less than 1.5% (*2.5%) at 1,000 Hz "O" VU recording
CROSS TALK		Better than 70 dB (*60 dB) monaural Better than 50 dB (*45dB) stereo
ERASE RATIO		Better than 70 dB
INPUTS	Mic input	0.8 mV (*1 mV) Impedance 30 k Ω
	Line input	100 mV Impedance 100 k Ω
	Din input	10 mV (*20 mV)
OUTPUTS	Line output	1.228V (4 dB ± 1.5 dB) using a 250 Hz "O" VU recorded tape
	Din output	0.4V
	Phone output	30 mV at 8 Ω
	Speaker output	20W total music power at 8 Ω 14W (*10W) continuous power at 8 Ω
BIAS FREQUENCY		103 kHz $\pm 5\%$
BIAS LEAK		Less than -20 VU
HIGH FREQUENCY DEVIATION		Within 3 dB using an 8,000 Hz 3-3/4 ips recorded tape at 7-1/2 ips
RECORDING CAPACITY		60 min. stereo recording using a 1,200 ft. tape at 7-1/2 ips
FAST FORWARD AND REWIND TIME		80/100 sec., using a 1,200 ft. tape at 60/50 Hz
MOTOR		2-4 pole Hysteresis synchronous 2-speed motor type: HM2-16SX Revolution: 3,600/3,000 r.p.m. at 60/50 Hz (High speed) 1,800/1,500 r.p.m. at 60/50 Hz (Low speed)
HEADS	Recording Head	In-Line 4-track 2-channel recording head Type: P4-154 Gap: 1 micron Impedance: 95 Ω $\pm 15\%$ at 1,000 Hz
	Playback Head	In-Line 4-track 2-channel playback head Type: P4-150 Gap: 1 micron Impedance: 1,250 Ω $\pm 15\%$ at 1,000 Hz
	Erase Head	In-Line 4-track 2-channel erase head Type: E4-200 Gap: 0.6 mm Impedance: 200 Ω $\pm 5\%$ at 100 kHz
TRANSISTORS		6 ... 2SC458 LG (C) 2 ... 2SC971 (2) (3) (red) 2 ... 2SC871 (E) (F) 1 ... 2SC1098 (L) (M)
IC		4 ... LD-3141 2 ... STK-011 (A) 1731W/L only
DIODES		4 ... V06B 1731W/L only 2 ... 1N34A 1 ... 10DC-1 blk
VARISTOR		1 ... RD-24AM
POWER SUPPLY		100 to 240V A.C. 50/60 Hz 120V A.C. 60 Hz for CSA Model
POWER CONSUMPTION		80W (55W ... 1731D)
INSULATION RESISTANCE		More than 50 M Ω
INSULATION DURABILITY		1,000V A.C. for more than 1 min. duration
DIMENSIONS/WEIGHT	1731W	428 (W) X 450 (H) X 227 (D) mm (16.9 X 17.7 X 9)"/17.2 kg (37.1 lbs.)
	1731L	436 (W) X 460 (H) X 250 (D) mm (17.1 X 18 X 9.8)"/19 kg (42 lbs.)
	1731D	418 (W) X 450 (H) X 227 (D) mm (16.4 X 17.7 X 9)"/15.6 kg (34.3 lbs.)

NOTE: Specifications subject to change without notice.

II. MEASURING METHOD

1. TAPE SPEED DEVIATION

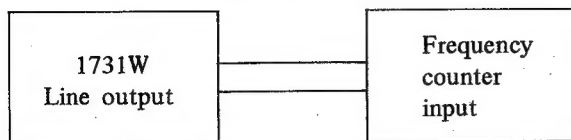


Fig. 1

As shown in Figure 1, connect a Frequency Counter to the Line Output of the recorder. Take a frequency counter reading at the beginning, middle, and end of tape winding during playback. The maximum value of these respective readings will represent tape speed deviation.

2. WOW AND FLUTTER

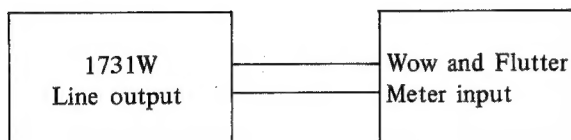


Fig. 2

Method A

As shown in Fig. 2, connect the Line Output of the recorder to the Input of a Wow and Flutter Meter. Use a 3,000 Hz pre-recorded test tape and take a wow and flutter meter reading at the beginning, middle, and end of tape winding. The maximum value of these respective readings will represent the wow and flutter.

Method B

Supply a 3,000 Hz sine wave signal from an Audio Frequency Oscillator and make a recording on a black tape at the beginning, middle, and end of tape winding. Rewind and playback tape. Measure wow and flutter with a Wow and Flutter Meter. (The wow and flutter value of Method B will be close to twice that of Method A.)

3. FREQUENCY RESPONSE

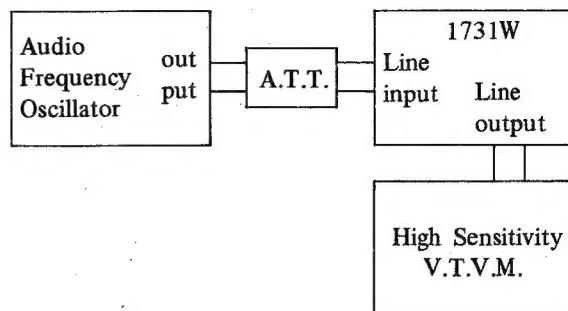


Fig. 3

For measuring frequency response, connect instruments as shown in Fig. 3 and proceed as follows:

- Supply a 1,000 Hz sine wave to the Line Input of the recorder from an Audio Frequency Oscillator through an Attenuator. Set recorder to recording mode and turn recording level volume control to maximum. Adjust Attenuator to obtain a +4 dB V.T.V.M. reading.
- Under conditions described in a. above, re-adjust Attenuator so that the Line Output is -16 dB, and record 40 to 22,000 Hz spot frequencies.
- Rewind tape and playback from the beginning. Take V.T.V.M. spot frequency readings and plot values on a graph.

NOTE: When measuring frequency response, new tape should be used.

4. SIGNAL TO NOISE RATIO

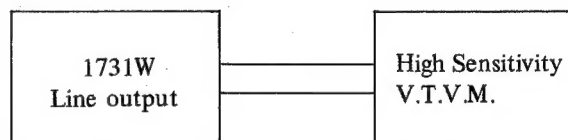


Fig. 4

As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line output of the recorder. Playback a 250 Hz "O" VU pre-recorded test tape and measure the output. Then remove the tape and measure the noise level under the same condition. Convert each of the measured values into decibels.

5. TOTAL HARMONIC DISTORTION FACTOR

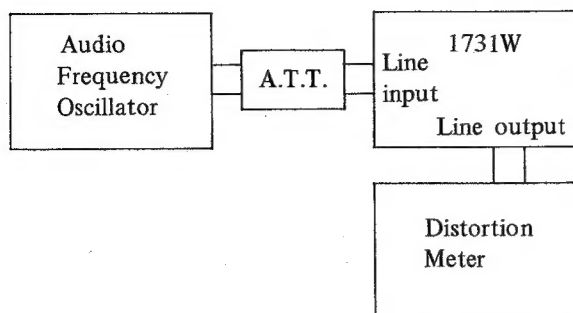


Fig. 5

Connect the measuring instruments as shown in Fig. 5 and record a 1,000 Hz sine wave signal at "0" VU. Playback the resultant signal and measure the overall distortion factor. Measure the noise level of the tape recorder without the tape. Connect the Audio Frequency Oscillator directly to the distortion meter for measurement of the distortion factor of the oscillator. The required distortion factor can be obtained from the results of the above measurement by the following formula:

$$d_0 = d - d_1 - d_2$$

Where, d_0 – Required distortion factor
 d – Overall distortion factor
 d_1 – Noise level
 d_2 – Distortion factor of the oscillator

NOTE: When measuring the distortion factor, new tape should be used.

6. CROSS TALK (Cross talk between the tracks)

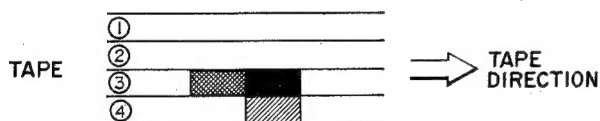


Fig. 6

As shown in Fig. 6, first record a 1,000 Hz sine wave signal on Track No. 3 at +3 VU level. Next, record under a non-input condition. Then, playback the tape on Tracks No. 3 and 4 through the B.P.F. (band pass filter sensitivity ... 1:1) and obtain a ratio between the two from the following formula:

$$C = 20 \log \frac{E_0}{E_2 - E_1} \text{ (dB)}$$

Where, C – Desired cross talk ratio (dB)
 E_0 – 1,000 Hz signal output level
 E_2 – 1,000 Hz cross talk level
 E_1 – Non-input signal recorded level

7. ERASE RATIO

As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line Output of the recorder. Playback a virgin tape and take a V.T.V.M. reading of the output level. Next, record a 1,000 Hz sine wave signal at +3 dB, then playback this recorded signal and take a V.T.V.M. reading of the output level. Next, using this pre-recorded tape, record under a non-input condition and take a reading of the noise level output of the erased signal and obtain a ratio between the two from the following formula:

$$Er = 20 \log \frac{E_0}{E_2 - E_1} \text{ (dB)}$$

Where, Er – Desired erase ratio (dB)
 E_0 – 1,000 Hz signal output level
 E_2 – Non-input signal recorded level
 E_1 – Virgin tape noise output level

8. POWER OUTPUT

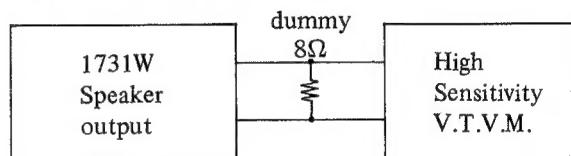


Fig. 7

As shown in Fig. 7, connect an 8Ω dummy load resistor to the speaker output of the recorder and connect this terminal to a High Sensitivity V.T.V.M. Playback a 250 Hz "O" VU pre-recorded test tape and take a V.T.V.M. reading of the output level. The resultant output can be obtained from the results of the above measurement by using the following formula:

$$P = \frac{E^2}{R} \text{ (W)}$$

Where, P – Desired power output (watts)
 E – Measured voltage (R.M.S.)
 R – 8Ω

III. DISMANTLING OF UNIT

In case of trouble, etc. necessitating disassembly, please disassemble in the order shown in photographs. Re-assemble in reverse order.

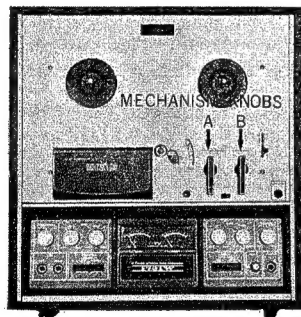
1



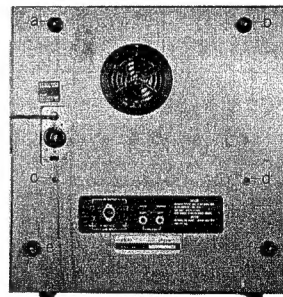
4



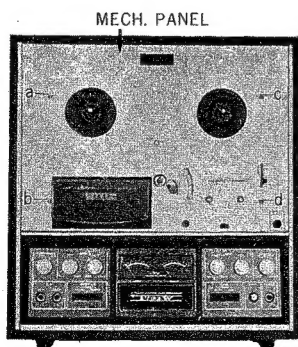
2



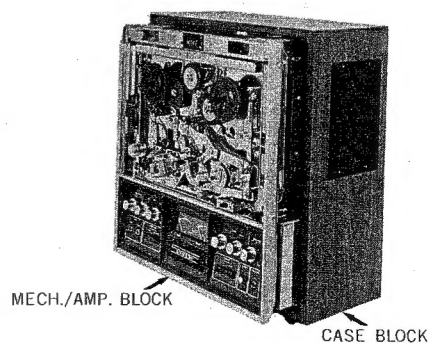
5



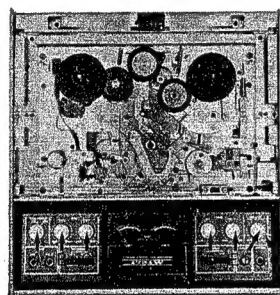
3



6

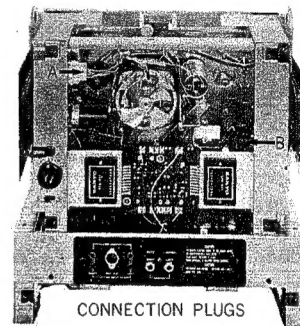


7



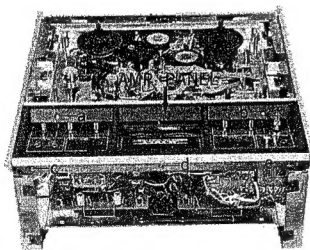
CONTROL KNOBS

10

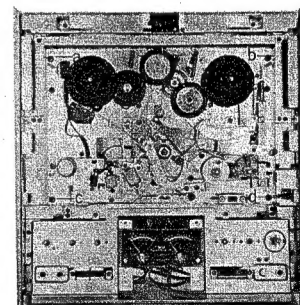


CONNECTION PLUGS

8

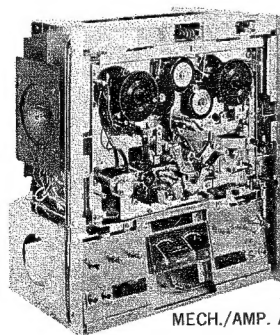


11



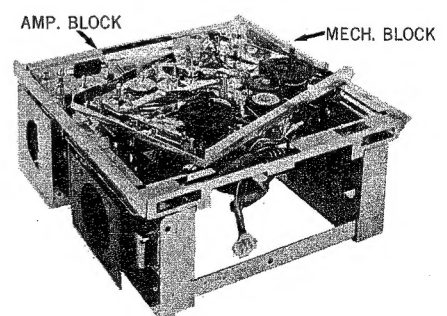
SCREWS

9



MECH./AMP. ADJUSTMENT

12



AMP. BLOCK

MECH. BLOCK

IV. OPEN REEL MECHANISM ADJUSTMENTS

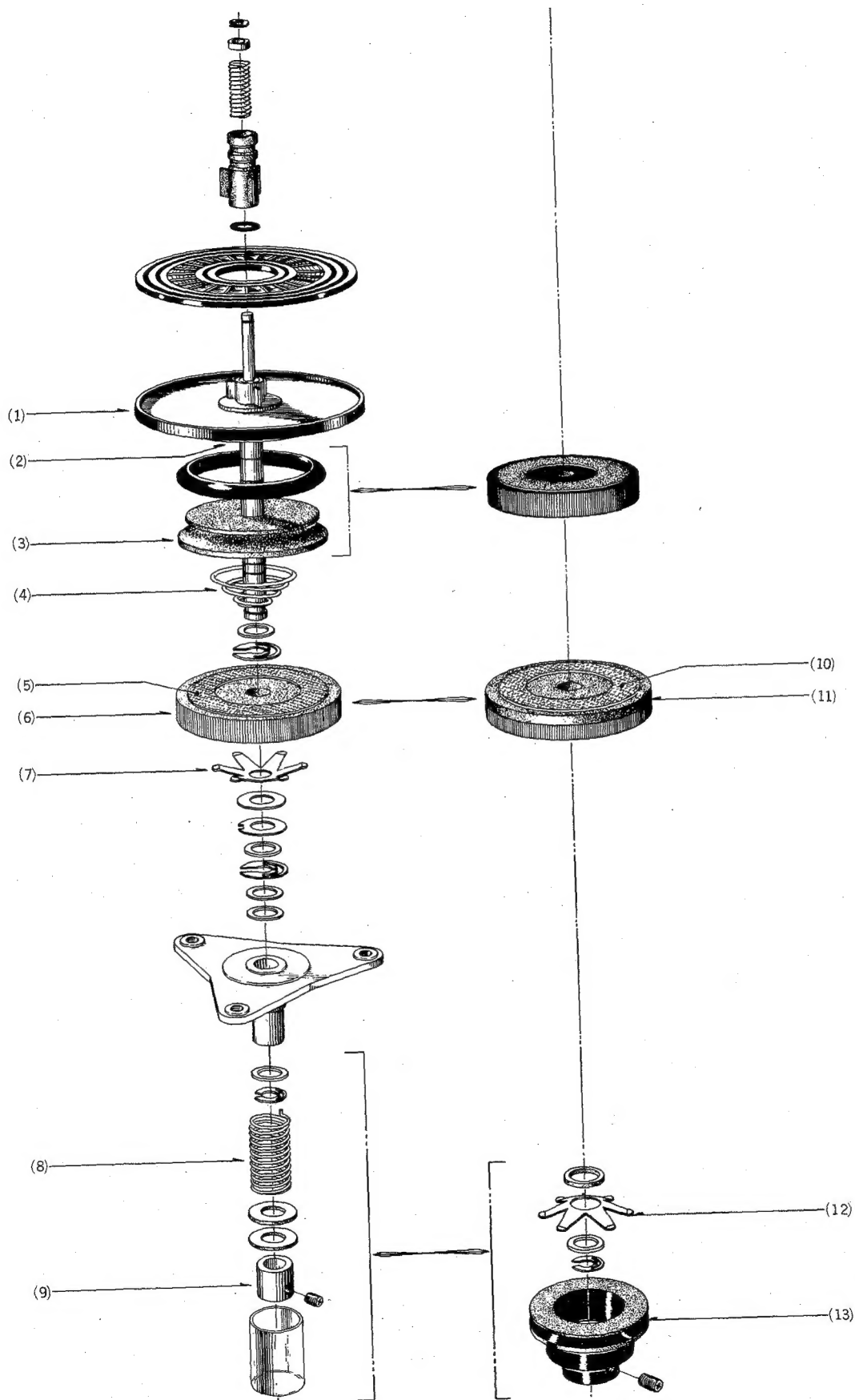


Fig. 8

1. PINCH WHEEL ADJUSTMENT

It is important that the pinch wheel shaft be kept in perfect alignment with the capstan shaft. Proper pinch wheel pressure is between 1,000 and 1,150 grams when the unit is operated at the tape speed of 7½ ips. Any deviation from this specification will result in wow and flutter. Check pinch wheel pressure with a spring scale, and if necessary, adjust the pinch wheel load spring.

2. SUPPLY REEL SHAFT ASSEMBLY ADJUSTMENT (See Fig. 8 at left)

Felt clutch material (2) is used between the lower side of the reel table base plate (1) and the rewind pulley (3) to protect recording tape from excessive tension during rewind operation. To check the amount of friction of this part, install a 5-inch reel with a 60 mm diameter tape, and gently pull the end of the tape upward with a spring scale. Adjust the conical spring (4) so that the amount of tension is kept between 400 and 500 grams. Other felt clutch material (5) is attached to the supply roller (6) to provide proper slippage during FWD and REC operation. The procedure for checking friction of this part is the same as the foregoing, and between 80 and 100 grams of tension gives best result. Adjust the spring (7) just under the supply roller (6). When the unit is set to fast forward operation, the amount of friction will decrease to from 15 to 20 grams. Check to see whether this is satisfactory. If not, adjust the spring plate (8) and the pressure of the set sleeve (9).

3. TAKE-UP REEL SHAFT ASSEMBLY ADJUSTMENT (See Fig. 8 at right)

Felt clutch material (2) is attached to the bottom side of the reel table base plate (1) so that the recording tape will not stretch during fast forward operation due to excessive tension. To check the amount of friction of this part, install a 5-inch reel with a 60 mm diameter tape, and gently pull the end of tape upward with a spring scale. Adjust the conical spring (4) so that the amount of tension at this part is kept between 400 and 500 grams. Other felt clutch material (10) is attached to the take-up roller (11). This is to provide proper slippage during FWD or REC operation. The procedure for checking friction of this part is the same as the foregoing, and between 150 and 180 grams of friction provides the best results. Adjust the spring plate (7) just under the take-up roller (11). When the unit is set to rewind operation, the amount of friction of this part will decrease to from 15 to 20 grams. Check to see whether this is satisfactory. If not, adjust the spring (12) and the pressure of the pulley (13).

V. HEAD ADJUSTMENTS

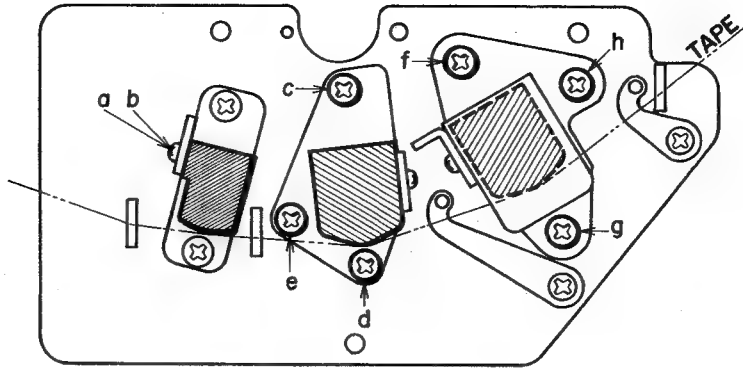


Fig. 9

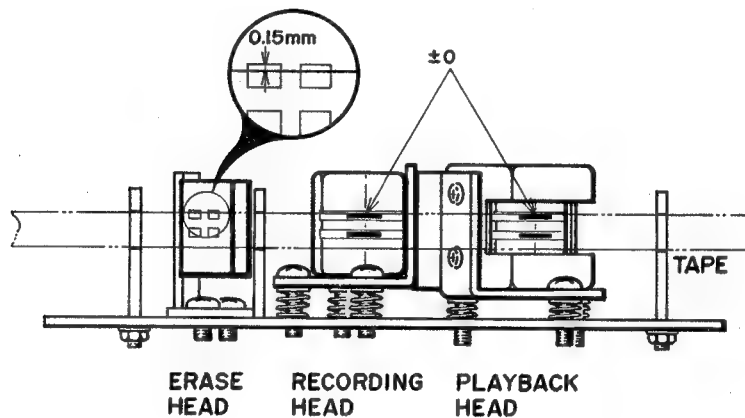


Fig. 10

Since adjustment of the Heads critically affects tape recorder performance, it is essential that Heads be carefully adjusted with precision measuring equipment and suitable recorded tape.

1. HEAD HEIGHT ADJUSTMENTS (See Figs. 9, 10)

- a. Erase Head
Adjust height control screws (a), (b) by turning to left and right so that the upper edge of the tape is 0.15 mm lower than the upper edge of the erase head core.
- b. Recording Head
Adjust screws (c), (d) by turning to left and right until the width between the upper edge of channel 1 head core and upper edge of the tape is equal.
- c. Playback Head
Adjust screws (f), (g) by turning to left and right until the width between the upper edge of channel 1 head core and the upper edge of the tape is equal.

2. HEAD SLANT ADJUSTMENT (See Figs. 9, 10)

Adjust the screws (Head Height control screw) by turning to left and right so that each head (Erase, Recording and Playback Head) contacts the tape surface at a right angle.

3. HEAD AZIMUTH ALIGNMENT ADJUSTMENTS (See Figs. 9, 10)

- a. Playback Head
Playback an Ampex Alignment test tape (8,000 Hz $3\frac{3}{4}$ ips.) at $7\frac{1}{2}$ ips. Adjust screw (h) turning to left and right until the various line outputs are maximum.
- b. Recording Head
At recording mode, supply a 15,000 Hz sine wave at a -16 dB recording level from an Audio Frequency oscillator to the line input of the 1731W, and set the monitor switch to "TAPE" position. Then adjust screw (e) by turning to left and right until the various line outputs are maximum.

4. Repeat adjustments outlined in Items 1-b to 3, above 2 or 3 times to obtain optimum adjusted condition.

VI. AMPLIFIER ADJUSTMENTS

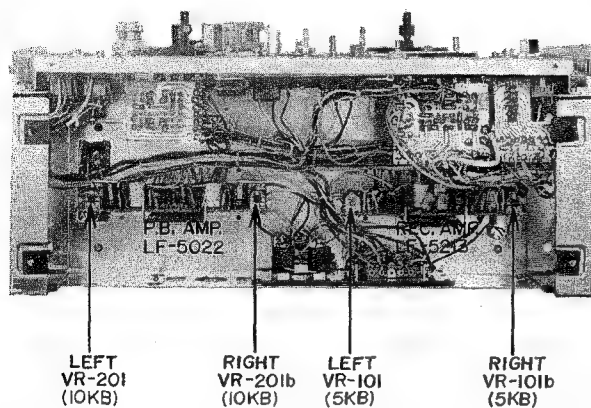


Fig. 11

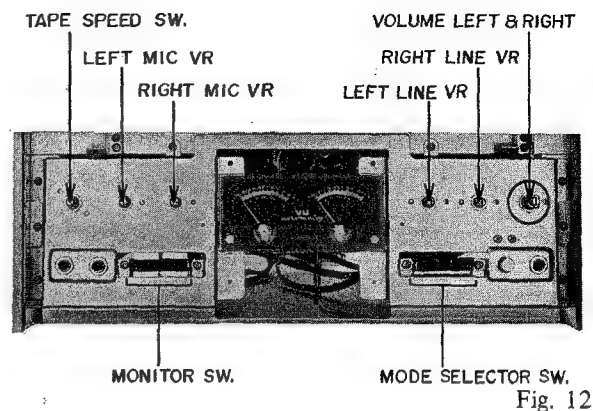


Fig. 12

1. PLAYBACK LEVEL ADJUSTMENT

(See Figs. 11, 12)

- Set the monitor switch to "TAPE" position and "TAPE SPEED" switch to 7½ ips.
- Connect a High Sensitivity V.T.V.M. to the line output.
- Playback a 250 Hz pre-recorded test tape at 7½ ips, and adjust semi-fixed resistor VR-201 and VR-201b (10k B) to obtain a 4 dB P.B. level. (VU meter indicates "O" VU)

2. RECORDING LEVEL ADJUSTMENT

(See Figs. 11, 12)

- Set the monitor switch to "TAPE" position and "TAPE SPEED" switch to 7½ ips.
- Connect an Audio Frequency Oscillator to the line input and High Sensitivity V.T.V.M. to the line output.
- Load a Scotch-111 blank tape and set recorder to "REC" mode.
- Supply a 1,000 Hz sine wave from an Audio Frequency Oscillator and adjust the line recording level control volumes (VR-1 and VR-3 10 k B) until the line output level reaches 4 dB. (VU meter indicates "O" VU)
- Set the monitor switch to "SOURCE" position.
- Adjust semi-fixed resistor VR-101 and VR-101b (5k B) to obtain 4 dB recording level. (VU meter indicates "O" VU)
- Repeat 2 times in the same way as indicated in Items d. to f. above.

O.S.C. P.C. BOARD LF-5210

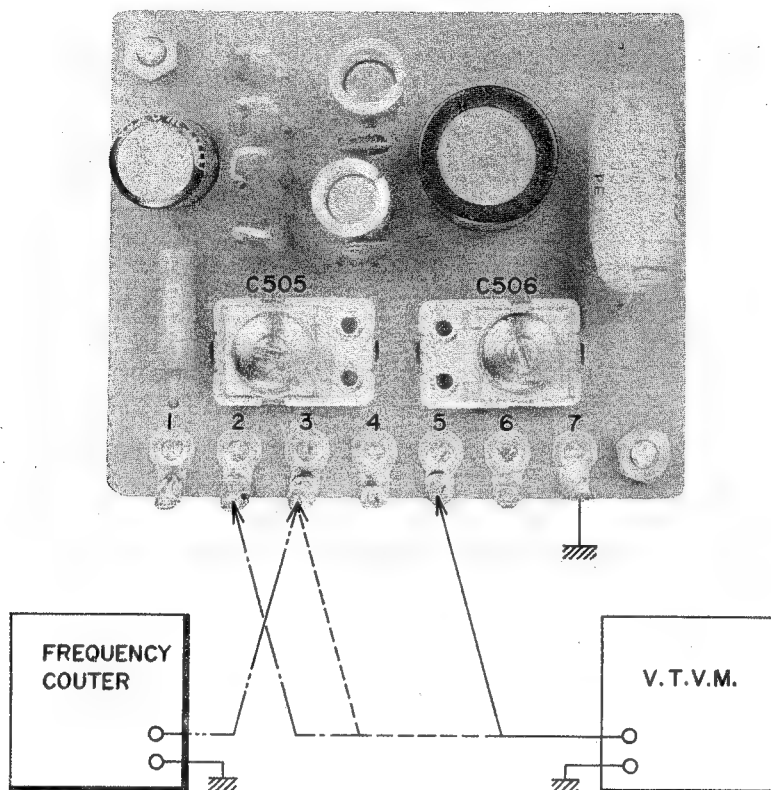


Fig. 13

3. RECORDING BIAS FREQUENCY ADJUSTMENT (See Fig. 13)

- Set the recorder to recording mode.
- Connect a Frequency counter to point (3) in Fig. 13 of the oscillator P.C. Board (LF-5210) and read the frequency indication.
- If the bias frequency is 103 kHz $\pm 5\%$, the bias frequency is correct.
- If the bias frequency is incorrect, it can be adjusted by changing the value of condenser C509 (5600 PF) of the oscillator P.C. Board (LF-5210).

4. RECORDING BIAS VOLTAGE ADJUSTMENT (FREQUENCY RESPONSE ADJUSTMENT) (See Fig. 13)

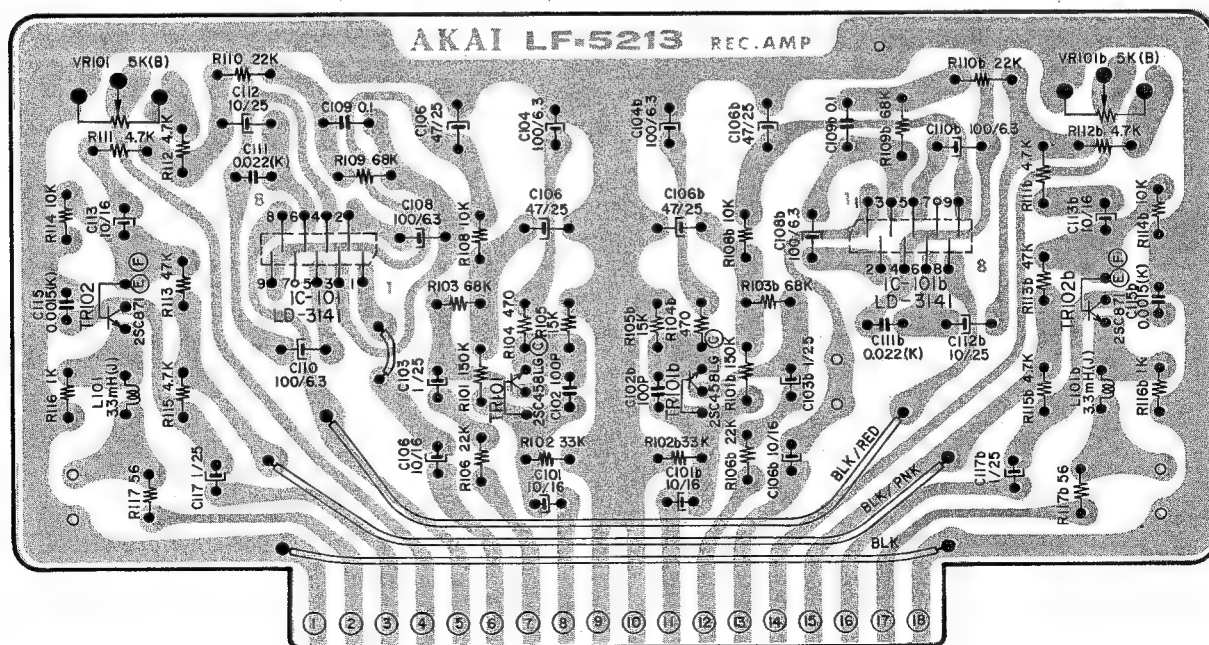
- Set the monitor switch to "TAPE" position and "TAPE SPEED" switch to 7½ ips.
- Connect an Audio Frequency Oscillator to the line input through an Attenuator and a High Sensitivity V.T.V.M. to the line output.
- Load a blank test tape "AKAI 100L" (Fuji S-100) and set the recorder to "REC" mode.

- Turn recording level control volume VR-1 and VR-3 (10k A) to obtain 4 dB V.T.V.M. reading.
- Under conditions described in Itemd. above, readjust attenuator so that the line output level is -16 dB.
- Record from 40 to 22,000 Hz spot frequencies.
- Adjust Bias Adjustment semi-fixed condenser C505 and C506 (70 PF max.) so that the outputs of 1,000 Hz and 10,000 Hz frequencies are equal.
- The bias voltage at this time is around 7V A.C.

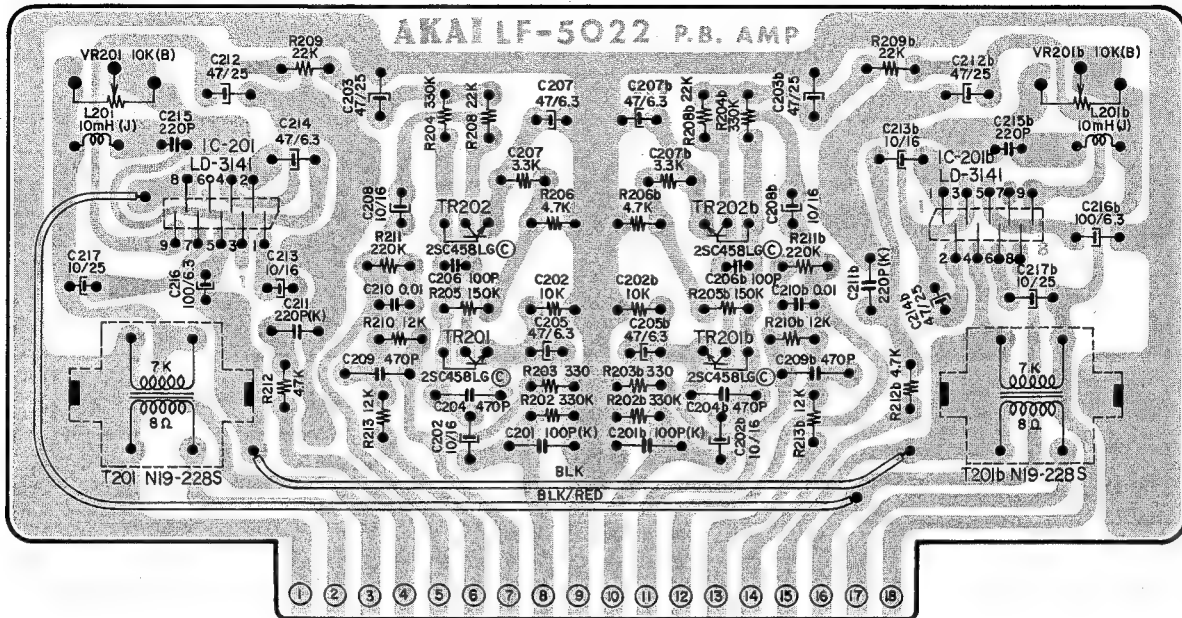
5. ERASE VOLTAGE

- Set the recorder to "REC" mode.
- Connect a V.T.V.M. to points (6) in Fig. 13 of the oscillator P.C. Board (LF-5210) and read the V.T.V.M. indication.
- The Erase Voltage is around 65V A.C.

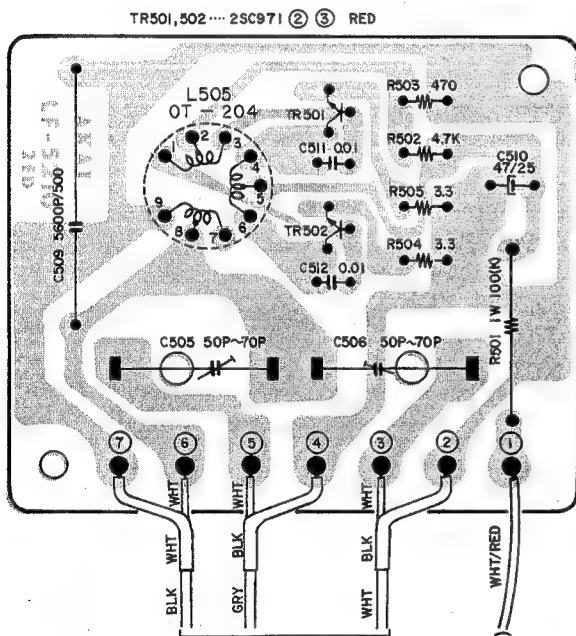
MAIN AMP. P.C. BOARD (LF-5214)



P.B. AMP. P.C. BOARD (LF-5022)



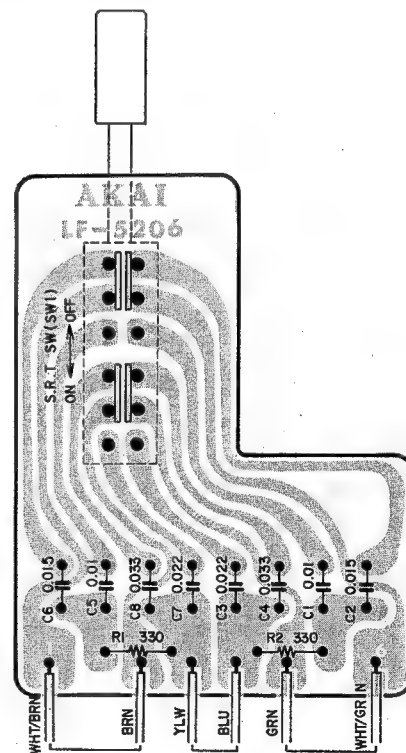
OSC. P.C. BOARD (LF-5210)



TO TRACK SELECTOR
SWITCH P.C. BOARD (LF-5211)

FROM POWER SUPPLY P.C. BOARD (LF-5208)

SRT SWITCH P.C. BOARD (LF-5206)

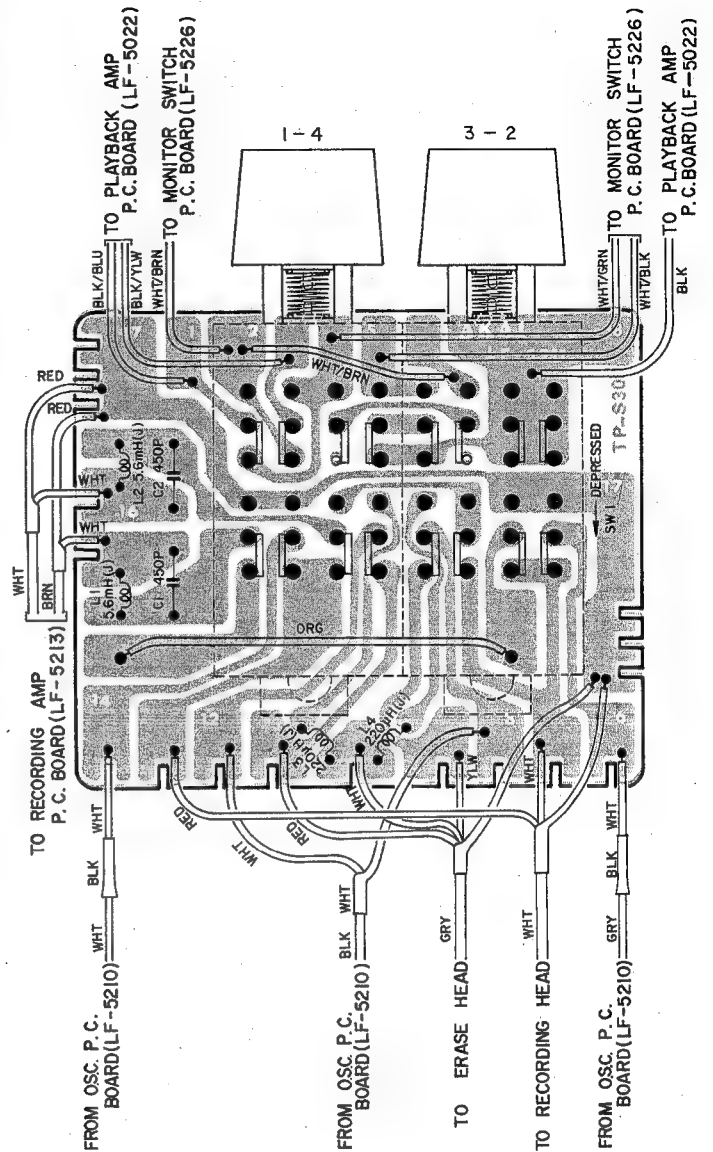
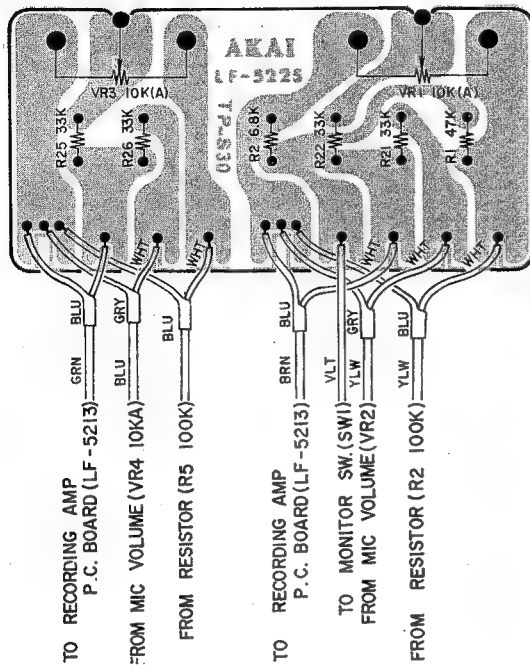


TO EQUALIZER
SWITCH (SW1)

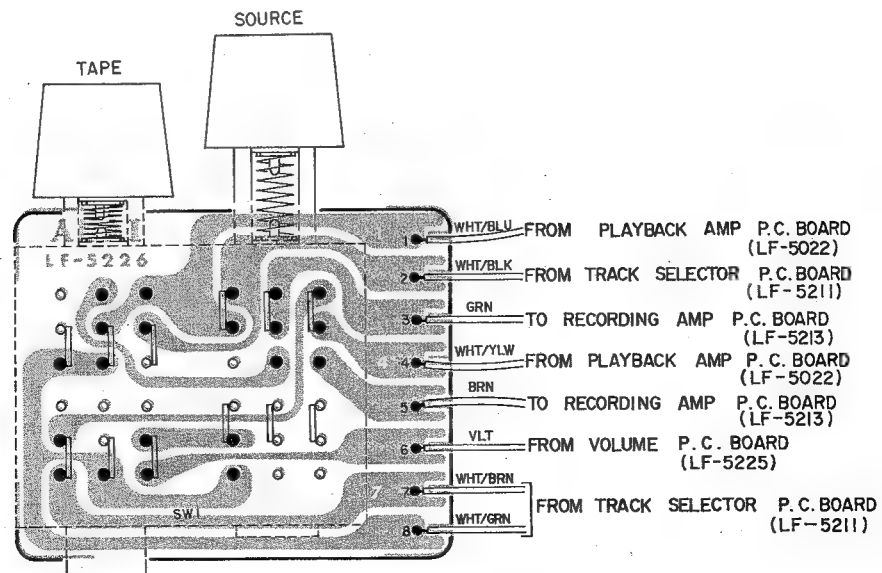
FROM RECORDING
AMP P.C. BOARD (LF-5213)

TO EQUALIZER
SWITCH (SW1)

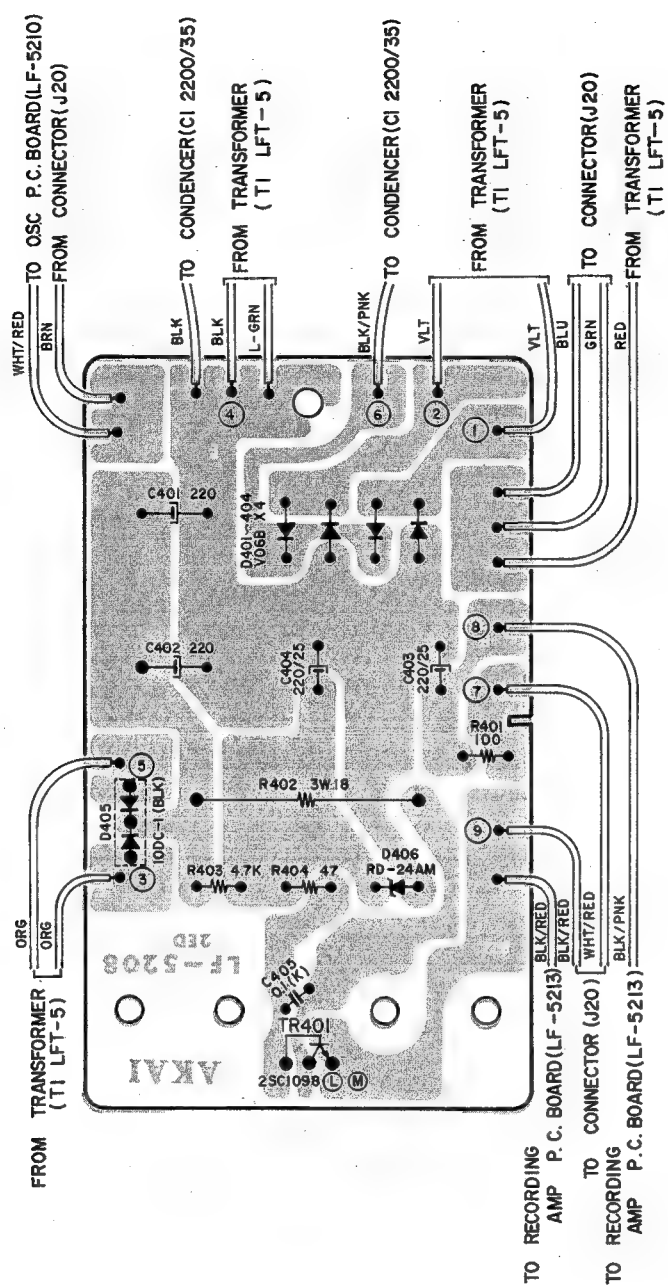
TRACK SELECTOR P.C. BOARD (LF-5211)



MONITOR SWITCH P.C. BOARD (LF-5226)



POWER SUPPLY P.C. BOARD (LF-5208)



SECTION 2

PARTS LIST

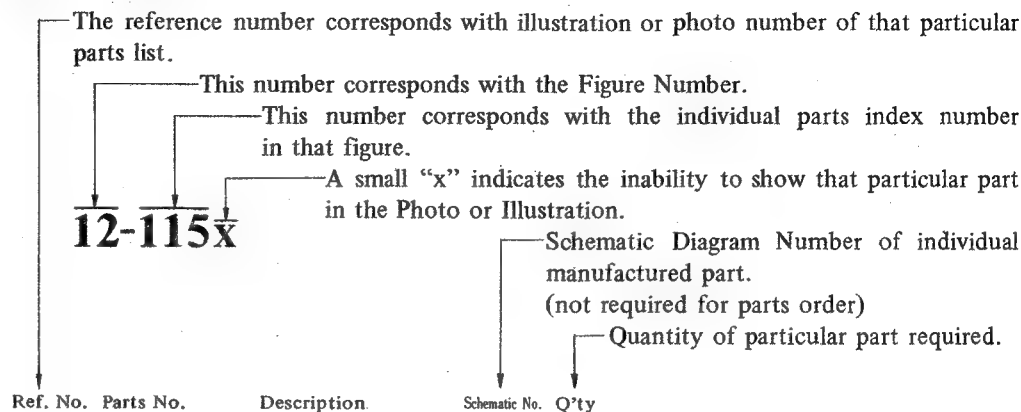
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HOW TO USE THIS PARTS LIST

1. This parts list is compiled by various individual blocks based on assembly process.
2. When ordering parts, please describe parts number, serial number, and model number in detail.
3. How to read list.

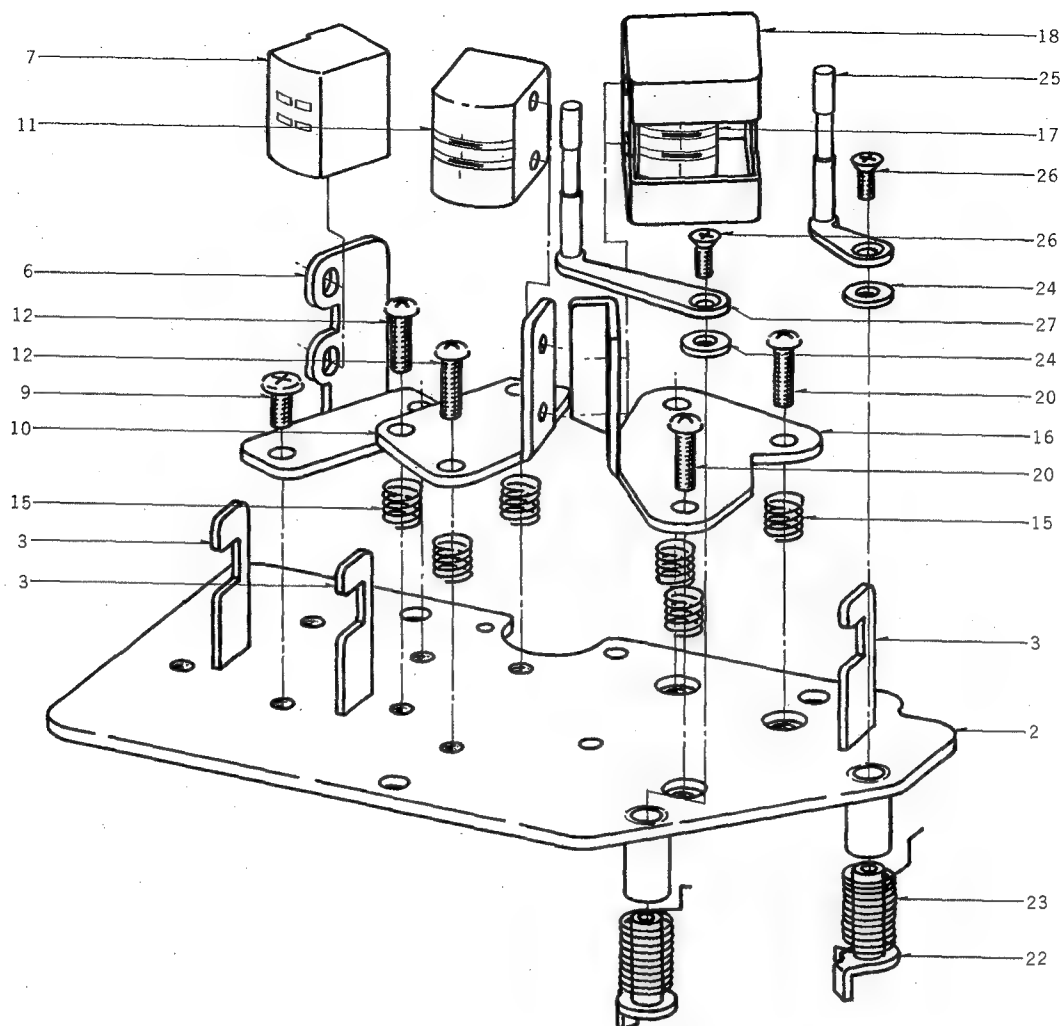


4. The symbol numbers shown on the P.C. Board list can be matched with the Composite Views of components of the Schematic Diagram or Service Manual.
5. The indications of Resistors and Capacitors in the photos of P.C. Board are being eliminated.
6. The shape of the parts and parts name, etc. can be confirmed by comparing them with the parts shown on the Electrical Parts List Table of P.C. Board.
7. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List.
It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index. (meaning of ref. no. outlined in Item 3 above).
8. Utilize separate "Price List for Parts" to determine unit price. The most simple method of finding parts Price is to utilize the reference number.

ELECTRICAL PARTS LIST TABLE

<p>Because the indication of resistors and capacitors in the P. C. Board photos are being eliminated, please confirm parts name and shape by comparing them with the parts shown in this table.</p>	<p>1</p>  <p>Solid Resistor</p>	<p>2</p> <p>Stopper Type</p>  <p>Insulator Type</p> <p>Carbon Resistor</p>	<p>3</p>  <p>Metal Oxide Film Resistor</p>
<p>4</p>  <p>Cement Resistor</p>	<p>5</p>  <p>Wire-Wound Resistor</p>	<p>6</p>  <p>Thermistor</p>	<p>7</p>  <p>Enamel Resistor</p>
<p>1</p>  <p>MP Capacitor (Tubler Type)</p>	<p>2</p>  <p>Plastic Capacitor</p>	<p>3</p>  <p>Mylar Capacitor</p>	<p>4</p>  <p>VFM (Hi-Q) Capacitor</p>
<p>5</p>  <p>Mylar Capacitor</p>	<p>6</p>  <p>Tantalum Capacitor</p>	<p>7</p>  <p>Oil Capacitor (Tubler Type)</p>	<p>8</p> <p>Vertical Type</p>  <p>Tubler Type</p> <p>Styrol Capacitor</p>
<p>9</p>  <p>Electrolytic Capacitor (Tubler Type)</p>	<p>10</p> <p>Vertical Type</p>  <p>Tubler Type</p> <p>Electrolytic Capacitor</p>	<p>11</p>  <p>Ceramic Capacitor</p>	<p>12</p>  <p>Metalized Mylar (Paper) Capacitor</p>
<p>13</p>  <p>Trimmer Condenser</p>		<p>VR</p>  <p>Semi-Fixed Volume</p>	
<p>L</p>  <p>Ferri Inductor</p>	<p>TR</p>  <p>Transistor</p>		
<p>CR</p>  <p>Spark Quencher</p>	<p>D</p>  <p>Diode (Silicon, Zener, Germanium)</p>		

FIG. 1 ILLUSTRATION OF HEAD BLOCK

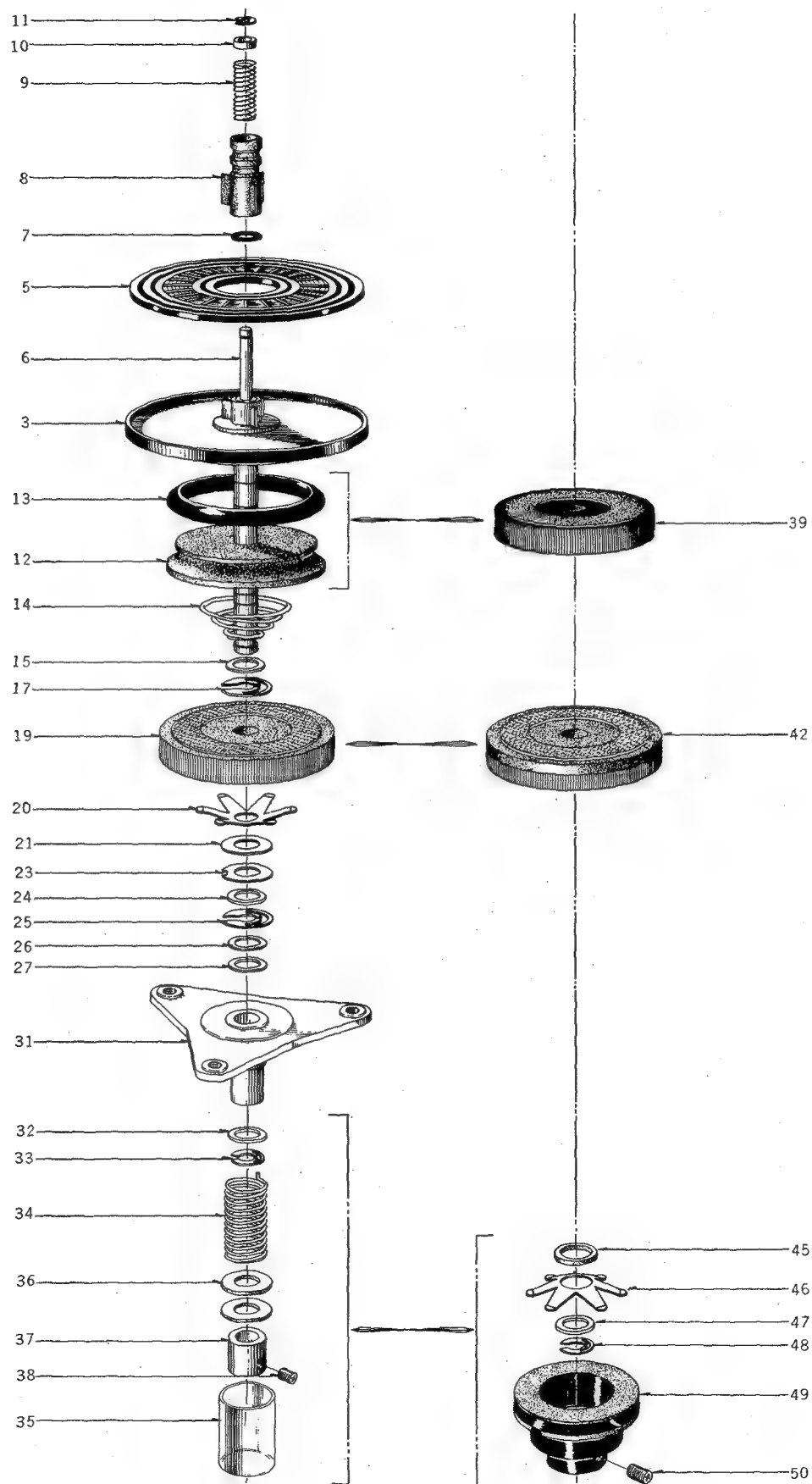


HEAD BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty	Ref. No.	Parts No.	Description	Schematic No.	Q'ty
1-1x	BH475435	Head Block Comp.	LF-2	1	1-17	HP375131	REC./P.B. HEAD P4-150		1
1-2	HZ410973	Head Base, w/metal	LF-0001	1	1-18	BC411017	Head Shield Case	LF-0005	1
1-3	HZ274162	Tape Guide #1	4TR-5	3	1-19x	ZW460440	Screw, pan head 2x4		2
1-4x	ZW273756	M3 Nut		3	1-20	ZW425114	Screw, round head 3x10		3
1-5x	ZW273778	M3 Earth Lug		1	1-21x	HZ393974	I-MK Head Terminal Plate	RC-89	1
1-6	HZ475233	Erase Head Base	LF-0201	1	1-22	HL223503	Shift Lever B, w/shaft	M9-3	2
1-7	HE384693	ERASE HEAD E4-200		1	1-23	ZG312928	Shifter Spring	LD-19	2
1-8x	ZW477876	Screw, pan head 2x3		2	1-24	ZW336846	Washer (SPC)D4.1x7x1.2t		2
1-9	ZW323728	Screw, binding head 3x5		2	1-25	HL223536	Shift Lever C, w/pin	M9-5	1
1-10	HZ410995	Rec. Head Base	LF-0003	1	1-26	ZW468527	Screw, oval countersunk head 2.3x6		2
1-11	HR475446	REC. HEAD P4-154		1	1-27	HL312941	Shift Lever, w/pin	LD-15	1
1-12	ZW425114	Screw, round head 3x10		3	1-28x	ZW413155	Screw, binding head 3x6		1
1-13x	HZ486270	I-MK Head Terminal Plate B	LF-0203	1	1-29x	EA382713	Head Connector P.C. Board	RD-A8	1
1-14x	ZW477876	Screw, pan head 2x3		2	1-30x	ZW323728	Screw, binding head 3x5		1
1-15	ZG364656	Angle Adjust Spring C	RD-57	6					
1-16	HZ411006	P.B. Head Table	LF-0004	1					

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 2 ILLUSTRATION OF REEL TABLE BLOCK (SUM)



REEL TABLE BLOCK (SUM)

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
2-1x	BR412110	Supply Reel Table Block (SUM) Comp. LF	1	1
2-2x	BR412121	Take-up Reel Table Block (SUM) Comp. LF	1	1
2-3	MT255712	Reel Table Disk B, w/shaft A	XR-101	1
2-4x	MT252112	Friction Cloth B	900-225	2
2-5	MT376110	Reel Table Rubber CD-2	CD-201	2
2-6	MS255600	Reel Shaft B	XR-103	2
2-7	MT297663	3R 'O' Ring 2.9x1.65M	3R-139	2
2-8	MT255420	Reel Retainer	3R-102	2
2-9	ZG255633	Reel Spring	3R-109	2
2-10	MT255565	Reel Shaft Ring	XR-177	2
2-11	ZW270088	'E' Ring 1.9M	6-1-9	2
2-12	MR251460	Rewind Pulley	900-222	1
2-13	MT222366	Rubber Ring	900-234	1
2-14	ZG227553	Spring G2 (left)	900-230	1
2-15	ZW260021	Washer (SUP)D6.1x10x0.13t		2
2-16x	ZW260098	Washer (SUP)D6.1x10x0.5t		2
2-17	MT255870	Reel Table Thrust Pin	900-237	2
2-18x	MT252101	Friction Cloth A	900-224	1
2-19	MR252066	Take-up Roller C	900-220	1
2-20	MT255971	Reel Table Spring Plate A	900-227	1
2-21	MT438647	Reel Torque Adjust Thrust 7 D6.2x13x0.5t	101022	2
2-22x	MT438636	Reel Torque Adjust Thrust 6 D6.2x13x1t	101021	2
2-23	ZW231693	Claw Thrust Washer	900-235	2
2-24	ZW260021	Washer (SUP)D6.1x10x0.13t		4
2-25	MT255870	Reel Table Thrust Pin	900-237	2
2-26	ZW260054	Washer (SUP)D6.1x10x0.25t		3
2-27	ZW260098	Washer (SUP)D6.1x10x0.5t		2
2-28x	MT438592	Reel Torque Adjust Thrust 2 D6.1x10x0.3t		2
2-29x	MT438603	Reel Torque Adjust Thrust 3 D6.1x10x0.5t	101018	2
2-30x	MT438625	Reel Torque Adjust Thrust 5 D6.1x10x1t	101020	3
2-31	MT292386	XR Reel Metal Mt. Part, w/metal	XR-191	2
2-32	MT438614	Reel Torque Adjust Thrust 4 D6.1x10x0.8t	101019	1
2-33	ZW312693	'E' Ring 4M	6-1-4	1
2-34	ZG434092	Spring F4-B	LF-2004	1
2-35	MT440313	Nylon Tube D12		1
2-36	MT438636	Reel Torque Adjust Thrust 6 D6.2x13x1t	101021	1
2-37	MT228598	Set Sleeve B	CD-66	1
2-38	ZW434160	Set Screw, hexagon socket 3x3(cup)		1
2-39	MR252044	Take-up Roller A	900-218	1
2-40x	ZG227542	Spring G2 (right)	900-230	1
2-41x	MT255881	Reel Table Slip Plate A (deer skin)	MH-219	1
2-42	MR252077	Take-up Roller D	M8-204	1
2-43x	MT255982	Reel Table Spring Plate B	900-228	1
2-44x	MT438581	Reel Torque Adjust Thrust 1 D5.8x10.3x1t	101016	1
2-45	MZ437804	Flywheel Thrust A D7.9x13x1t	101024	1
2-46	MT255993	Reel Table Spring Plate C	M8-207	1
2-47	ZW260065	Washer (SUP)D6.1x10x0.35t		1
2-48	ZW270000	Retaining Pin D4	900-257	1
2-49	MR256094	Reel Table Pulley	900-239	1
2-50	ZW434171	Set Screw, hexagon socket 4x7(cup)		1

MOTOR/BELT CHANGE LEVER BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
MOTOR BLOCK				
3-1x	BM412380	Motor Block (HM2-16) Comp. LF		1
3-2	MZ448222	24 Motor Cover, w/metal	24X-781	1
3-3	ZW427037	Screw, pan head 4x50, w/washer		4
3-4	MZ254316	24 Motor Prop B	24X-729	4
3-5	MZ254373	Motor Mt. Plate L	24X-733	1
3-6	MZ254305	Motor/R. Table	RC-112	1
3-7	MZ254160	Motor Prop A	24X-730	2
3-8	MZ254182	Motor Prop B	24X-731	1
3-9	ZW424056	Screw, pan head 4x10		4
3-10	ZW272395	M-7 Motor Prop Set Screw	24X-732	1
3-11	ZW427026	Screw, countersunk head 4x10		2
3-12x	EJ296144	24 Oil-cut	24X-735	2
3-13x	ZW222388	Rubber Washer	24X-739	1
3-14x	ZW259885	Washer (PBP)D5.1x10.3x0.1t		1
3-15	MR411603	Motor Pulley, w/pin	LF-7001	1
3-16	MR257984	Knurling Pulley, w/retainer B	24X-740	1
3-17	ZW413921	Screw, oval countersunk head 3x15		1
3-18x	MZ292364	XR Motor Shield Plate B	XR-705	1
3-19	MZ316326	Motor Out-side Shield (large) A	10R-714	1
3-20x	MZ337724	Motor Out-side Shield (large) B	10R-716	1
3-21	MZ256882	Motor Fan D, w/boss	MH-636	1
3-22	ZW476987	Set Screw, hexagon socket 5x4		1
3-23	EC411682	MP/C. 2+1+0.8µ 250WVAC (Lug type Uni/D.)	24-9-53	1
3-24	ZW413223	Screw, binding head 3x5, w/washer		2
BELT CHANGE LEVER BLOCK				
3-25x	BL412108	Belt Change Lever Block (C) Comp. C		1
3-26	ML411704	Belt Change Lever C (small), w/roller B	LF-2002	1
3-27	MZ248354	Belt Guide Stop, w/metal	4TR-221	1
3-28	ZG217337	Belt Return Spring	4TR-224	1
3-29	ZW413201	Screw, pan head 4x8		1
3-30x	ZG217394	Belt Change Spring B	MH-125	1
3-31x	ZW260054	Washer (SUP)D6.1x10x0.25t		1
3-32x	ZW290283	'U' Ring 2.85M	6-1-1	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 3 ILLUSTRATION OF MOTOR/BELT CHANGE LEVER BLOCK

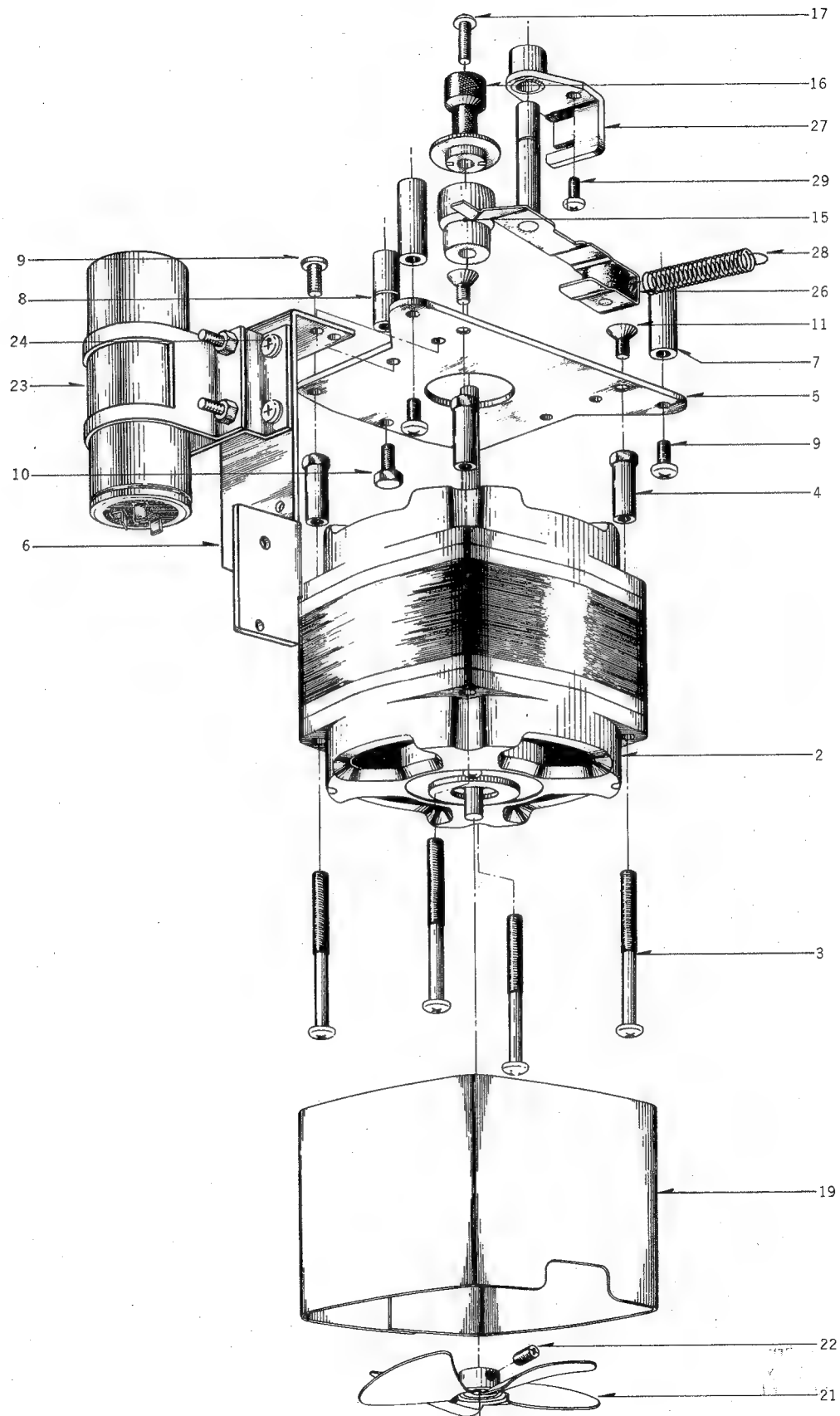
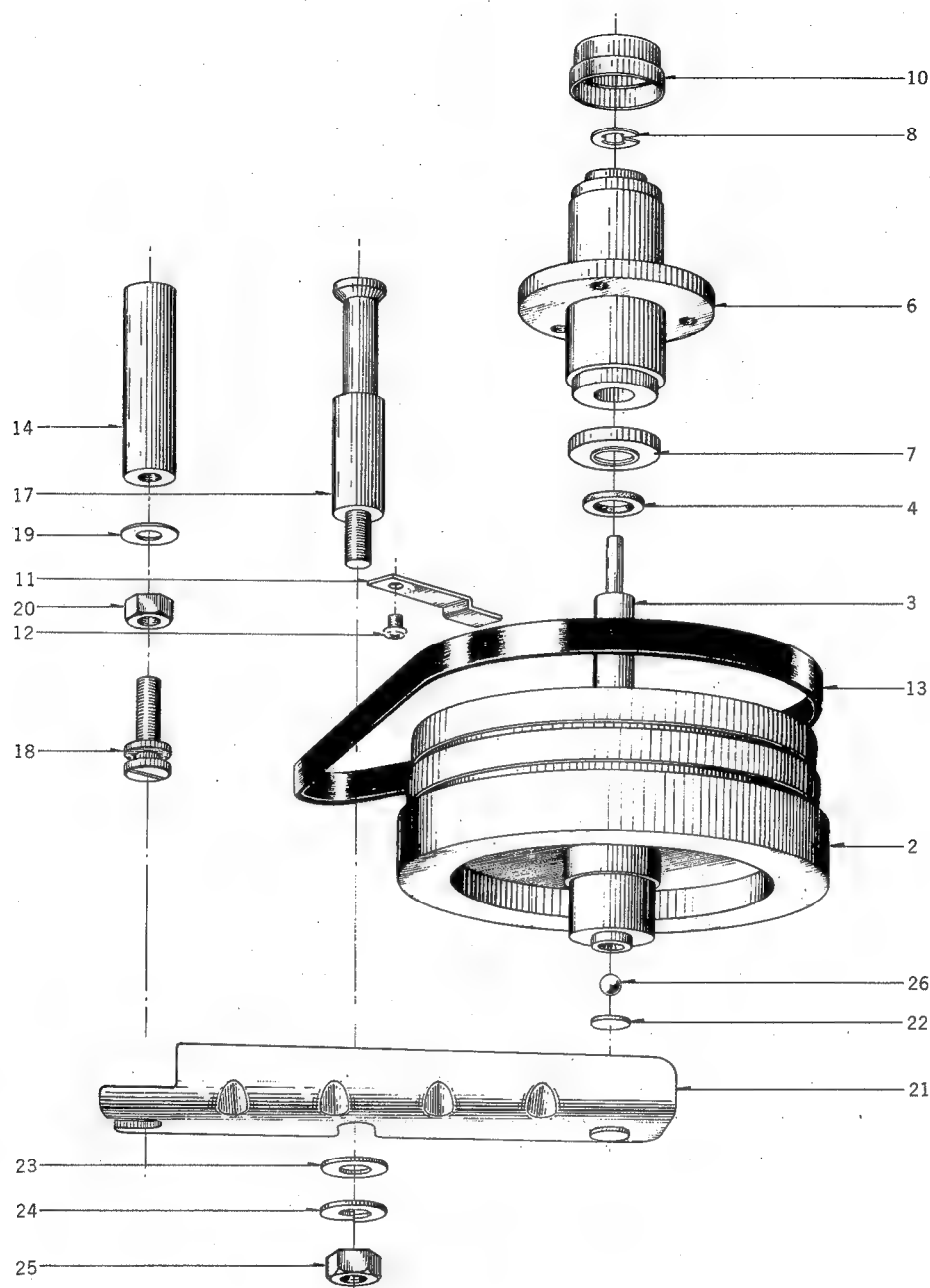


FIG. 4 ILLUSTRATION OF FLYWHEEL BLOCK

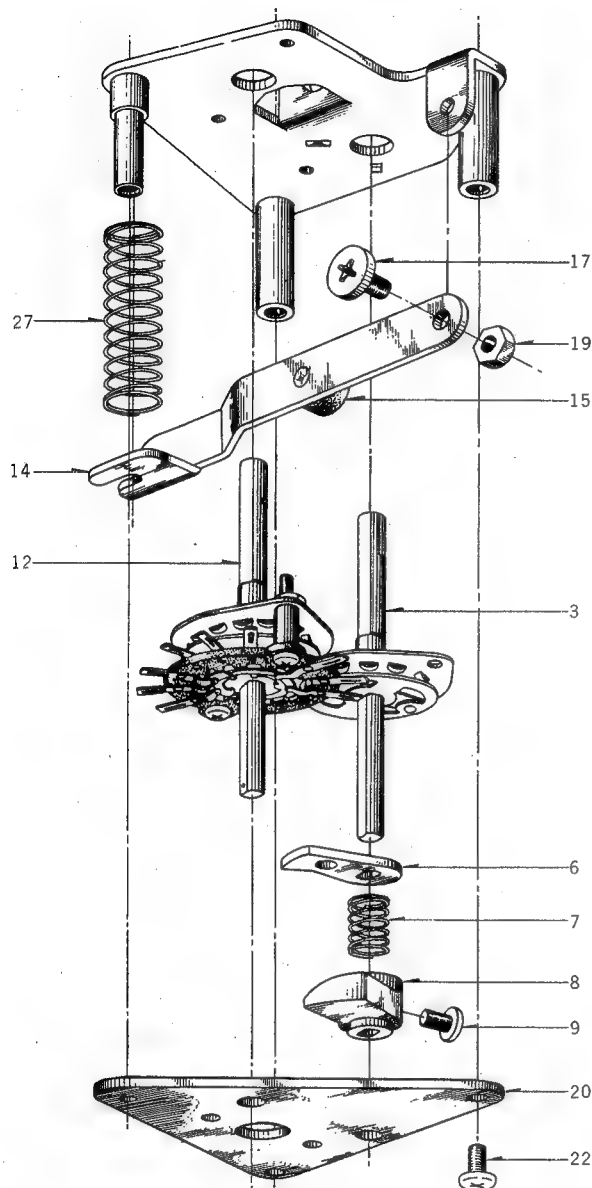


FLYWHEEL BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty	Ref. No.	Parts No.	Description	Schematic No.	Q'ty
4-1x	BF412143	Flywheel Block Comp.	LF	1	4-12	ZW425981	Screw, binding head 3x3		1
4-2	MZ296245	Flywheel 24	MH-202	1	4-13	MB256590	Double Face Flat Belt D110	100912	1
4-3	MS411592	LF Main Shaft	LF-2001	1	4-14	MZ244631	Flywheel Prop B	4TR-115	1
4-4	ZW447208	Flywheel Thrust B D7.9x1 3x0.5t 101025		1	4-15x	MZ413201	Screw, pan head 4x8		2
4-5x	ZW373577	Set Screw, hexagon socket 5x6(flat)		2	4-16x	ZW273914	M4 Spring Washer		2
4-6	MZ296267	Main Case B-24 Comp.	1630-205	1	4-17	MZ244664	Flywheel Prop C	U-102	1
4-7	MZ446635	Thrust Cap, Main Metal B2	LF-2006	1	4-18	ZW244574	Flywheel Support Adjust Screw	4TR-114	1
4-8	ZW244710	Flywheel Fixing Pin	900-250	1	4-19	ZW393085	Washer (SUP)D5.1x10.3x0.25t		1
4-9x	MZ244113	Felt D12.5x16x2t		1	4-20	ZW413278	M5 Nut		1
4-10	MZ253113	Main Metal Cap B	MH-208	1	4-21	MZ393221	Flywheel Support Plate D	LS-1005	1
4-11	MZ436847	Flywheel Belt Holding Plate A	LF-1012	1	4-22	ZW392681	Washer, without hole D8x1t		1
					4-23	ZW413998	Washer (SPC)D6.8x12.7x1t		1
					4-24	ZW393232	1/4 Inch Spring Washer		1
					4-25	ZW413208	Inch Nut 1/4 mountain = 20		1
					4-26	MV269965	Steel Ball D4		1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

**FIG. 5 ILLUSTRATION OF
SWITCH BLOCK (SUM)**



SWITCH BLOCK (SUM)

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
5-1x	BS412132	Switch Block (SUM) Comp.	LF	1
5-2	MZ225641	Switch Table A, w/props	900-201	1
5-3	ES256803	Rewind Shaft RS-1H, w/scratch	25-8-3	1
5-4x	ZW202083	Screw, binding head 3x5, w/washer		2
5-5x	ZW260133	Washer (Fiber)D6.1x10x1t		2
5-6	MZ217067	Cam Trap Plate	900-210	1
5-7	ZG227586	Spring K	900-214	1
5-8	MZ217304	Cam C	900-207	1
5-9	ZW201778	Screw, pan head 4x8		1
5-10x	ZW434215	Washer (Nylon)D6.1x10.3x0.3t		1
5-11x	ZW434193	Washer (Nylon)D6.1x10.3x0.5t		1
5-12	ES228330	S type Play Shaft S-133HB	25-7-3	1
5-13x	ZW273756	M3 Nut		2
5-14	ML257128	Lever I, w/shaft B	900-209	1
5-15	MZ217203	Cam Roller A	900-153	1
5-16x	ZW290283	'U' Ring 2.85M	6-1-1	1
5-17	ZW217877	Pause Lever Set Screw	900-136	1
5-18x	ZW260166	Washer (Nylon)D6.2x13x0.125t		1
5-19	ZW413188	M4 Nut		1
5-20	MZ225720	Switch Table B-2	M9-308	1
5-21x	ZW273881	M4 Earth Lug		1
5-22	ZW413201	Screw, pan head 4x8		3
5-23x	MZ217260	Cam A-2	900-205	1
5-24x	MZ217271	Cam B, without Tap	900-206	1
5-25x	ZW413201	Screw, pan head 4x8		2
5-26x	MV270066	Steel Ball D8		1
5-27	ZG227485	Spring E	900-119	1

MECHANISM ASSEMBLY BLOCK (I)

Ref. No.	part No.	Description	Schematic No.	Q'ty
TAPE GUIDE BLOCK #4				
6-1x	BZ300948	Tape Guide Block #4 Comp.	LF, LE, DF, LS	1
6-2	MZ204311	Tape Guide Prop #1700	AT-16	1
6-3	SZ465377	Tape Guide Table A	LC-618	1
6-4	ZW231805	Tape Guide Washer (large)	3A-356	2
6-5	MV248117	Bearing 635AHZZ-CIE-B32		1
6-6	SZ465388	Tape Guide Table B	LC-619	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

Ref. No.	Parts No.	Description	Schematic No.	Q'ty	Ref. No.	Parts No.	Description	Schematic No.	Q'ty
MECHANISM ASSEMBLY BLOCK									
6-7	MZ410905	New Mech. Frame, w/bush, pin B	M9-301	1	6-72	MZ217113	Cam Stopper B	RC-129	1
6-8	MZ273295	M-9 Mech. Panel Prop	M9-302	4	6-73	ZW217102	Cam Stopper Insulator Base	900-165	1
6-9x	ZW414033	Screw, countersunk head 3x8		4	6-74	ZW413245	Screw, pan head 4x15		2
6-10	MS257051	Lever FA Shaft	900-127	1	6-75	SB258478	Rec. Button (red)	900-167	1
6-11x	ZW273914	M4 Spring Washer		2	6-76x	ZW413256	Washer (SPC)D3.4x7.8x0.5t		1
6-12x	ZW273881	M4 Earth Lug		2	6-77x	ZW260436	Cotter Pin 1x12		1
6-13x	ZW413188	M4 Nut		7	6-78	ML217934	Supply Brake Comp.	900-113	1
6-14x	ML435914	Reinforcement Metal A	LF-1010	1	6-79x	MT245215	Brake Rubber (large)	900-163	1
6-15	HZ247511	Head Prop C	900-142	3	6-80x	ZW259942	Washer (Fiber)D5.1x10.3x0.5t		2
6-16x	ZW413201	Screw, pan head 4x8		2	6-81	ZW290283	'U' Ring 2.85M	6-1-1	9
6-17x	ZW414044	Screw, countersunk head 4x8		1	6-82	ZG290384	UN Spring D	1630-108	1
6-18	MZ257073	Lever FB Guide Base	M9-103	1	6-83	ML251932	Take-up Brake Com~	900-114	1
6-19x	ZW417150	Screw, pan head 4x6		2	6-84x	MT376457	Brake Rubber (small)	M8-110	1
6-20	ZG257095	Lever FB Vibration Proof			6-85	ZG227452	Spring D	900-118	1
		Spring	M8-104	1	6-86	ML300161	707 Lever A, w/metal	LC-103	1
6-21x	MZ410938	Belt Guide Pin	LF-1009	1	6-87x	ZW260087	Washer (Fiber)D6.1x10x0.5t		1
6-22	MS245463	Brake Lever Shaft	900-129	2	6-88	ML257196	Lever LC, w/lever E2	LC-308	1
6-23x	MZ245485	Brake Lever Pin (CSA)	MH-138	1	6-89x	ZW413302	Screw, pan head 4x5		2
6-24x	MZ452496	Cycle Angle (CEE)	LS-1007	1	6-90	ML262337	Lever C3	M8-106	1
6-25x	ML308564	Belt Vibration Stopper (CSA)	MH-137	1	6-91x	ZW259918	Washer (Presspan)		
6-26	MS260515	A Lever Shaft	900-126	1			D5.1x10.3x0.25t		2
6-27	ES250042	Micro Switch V-1A U/L	25-1-1	2	6-92	ZG217337	Belt Return Spring	4TR-224	1
6-28	MZ479834	Micro Insulator S	MS-1020	1	6-93	MZ260662	AS Lever Base, w/prop	4TR-236	1
6-29	ZW414055	Screw, binding head 3x30		1	6-94	ZW323728	Screw, binding head 3x5		3
6-30	ZW414066	Screw, binding head 3x25		1	6-95	ZW273767	Earth Lug D3x20L		1
6-31	MZ205817	Actuator JW-560	21-1-5	1	6-96	ML257040	Lever FA, w/shaft B	900-107	1
6-32x	ZW273756	M3 Nut		1	6-97	MZ217203	Cam Roller A	900-153	1
6-33x	ZW462835	Washer (PBP)D4.3x11x0.2t		1	6-98	ML295727	2 Speed Motor Lever F,		
6-34x	ZW462846	Washer (PBP)D4.3x11x0.3t		1			w/shaft	M8-107	1
6-35	MZ410927	Shifter Cam, w/spring	LF-1004	1	6-99x	ZW260087	Washer (Fiber)D6.1x10x0.5t		1
6-36	MZ312535	Shifter Cam Collar	LD-107	1	6-100	ZG270358	F.B Pull Spring	M8-108	1
6-37	ZG208091	Impedance Arm Spring	RD-269	1	6-101x	ZW376391	Washer (Polyslider)		
6-38x	ZW393726	Screw, truss head 3x10		1			D6.1x10x0.13t		2
6-39	ES375478	Slide Switch ESD-279DU	25-3-23	2	6-102	ML257163	Lever K, w/shaft	900-111	1
6-40	MZ210071	Auto. Switch Plate	M8-114	1	6-103x	ZW260166	Washer (Nylon)		
6-41	ZW440291	Iso Screw, countersunk head					D6.2x13x0.125t		2
		3x6		2	6-104	ZW223233	Fulcrum Screw A	900-135	1
6-42	ZW413166	Screw, round head 3x6		2	6-105	ZG224796	New Spring D	MH-142	1
6-43	MZ410951	Switch Retaining Plate	LF-1002	1	6-106	ML231423	Middle Wheel, w/metal	900-155	1
6-44x	ZW379405	Iso Screw, binding head 3x6		2	6-107	ML272992	M-9 Pinch Roller Lever	M9-105	1
6-45x	ZW413155	Screw, binding head 3x6		2	6-108	MS272970	M-9 Pinch Roller Shaft	M9-106	1
6-46x	ZW330412	Adjust Washer (U)			6-109x	ZW303491	Washer (SUP)D4.3x11x0.8t		1
		D4x13x0.13t		1	6-110	ZW413188	M4 Nut		1
6-47x	ZW330423	Adjust Washer (U)			6-111	MS217192	Cam Roller Shaft A	900-130	1
		D4x13x0.25t		1	6-112	MR217214	Cam Roller B	4TR-240	1
6-48x	ZW413190	Adjust Washer (U)			6-113	ZG227417	Spring A	900-115	1
		D4x13x0.8t		1	6-114x	ZW396437	Washer (Polyslider)		
6-49x	MZ219576	Cord Retainer D	M9-123	1			D5.1x10.3x0.25t		1
6-50x	MZ436050	Belt Retainer	LF-1011	1	6-115	ML327328	Pause Lever (SX), w/set screw	SX-122	1
6-51	ML475920	New Spring Hanger	900-185	1	6-116	ZW217877	Pause Lever Set Screw	900-136	1
6-52x	ZW323728	Screw, binding head 3x5		2	6-117	MZ217855	Pause Stopper	900-169	1
6-53	ML309093	Lever B, w/lever D	900-103	1	6-118	ZW323728	Screw, binding head 3x5		1
6-54	MZ217203	Cam Roller A	900-153	1	6-119	ZG217866	Pause Lever Spring A	900-123	1
6-55	MR217214	Cam Roller B	4TR-240	1	6-120x	ZW259795	Washer (SUP)D4.3x11x0.13t		1
6-56x	ZW290283	'U' Ring 2.85M	6-1-1	2	6-121	MZ217686	Pause Lever Cushion	LC-102	1
6-57	MG469427	Spring B-1	LS-2004	1	6-122	MZ293567	Head Lifter Cam A #1630	1630-104	1
6-58	MZ253653	Metal Mt. Part, w/metal	900-174	1	6-123	MZ293578	Head Lifter Cam B #1630	1630-105	1
6-59x	ZW413201	Screw, pan head 4x8		1	6-124	ZG312748	Shifter Spoke	LD-108	1
6-60x	ZW413267	Flange Nut M4		1	6-125x	ZW413223	Screw, binding head 3x5,		
6-61	ML270685	G Lever, w/H lever	900-109	1			w/washer		1
6-62	MS205560	Idler Shaft B	100150	1	6-126	BL204658	AS Lever #2 Comp.		1
6-63x	ZW260076	Washer (Nylon)D6.1x10x0.5t		2	6-127x	ZW322525	Washer (PBP)D4.1x7x0.2t		1
6-64	MI204423	Idler Wheel #2		2	6-128	ZG293692	AS Lever Spring #1630	1630-103	1
6-65	ZW376391	Washer (Polyslider)			6-129	ZW290294	'U' Ring 2.85M	6-1-1B	1
		D6.1x10x0.13t		2	6-130x	EJ411636	9P Mate-N-Lock Comp.	LF-1007	1
6-66	ZW290283	'U' Ring 2.85M	6-1-1	2	6-131x	SZ226282	Cord Holder, Standard B	900-180	1
6-67	ZG205571	Idler Tension Spring	MH-135	1	6-132x	MB229138	Side Wire Band	2-35-1	1
6-68	MZ217708	Pause Lever Retaining Metal B	900-170	1	6-133x	EJ285975	Cramp Terminal 1-SD	32-1-7	5
6-69	MZ327251	G Lever Stopper (SX)	SX-110	1					
6-70x	ZW413223	Screw, binding head 3x5,			6-134	MZ217260	Cam A-2	900-205	1
		w/washer		1	6-135	ZW413201	Screw, pan head 4x8		2
6-71x	MZ256814	Rewind Shaft Spacer	M9-124	2	6-136	MZ217271	Cam B, without Tap	900-206	1
					6-137	MV270066	Steel Ball D8		1
					6-138	ZG217394	Belt Change Spring B	MH-125	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 6 ILLUSTRATION OF MECHANISM ASSEMBLY BLOCK (I)

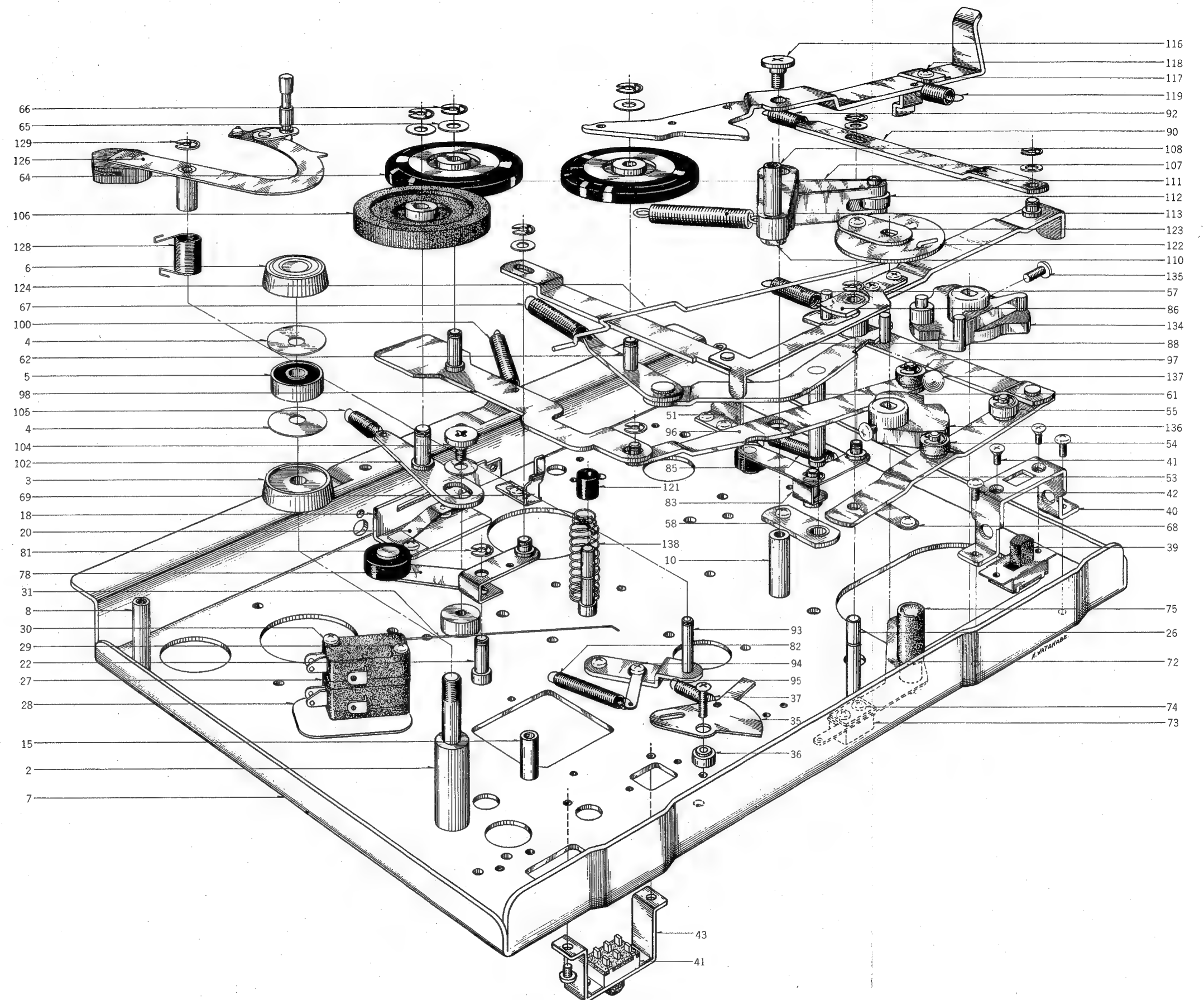
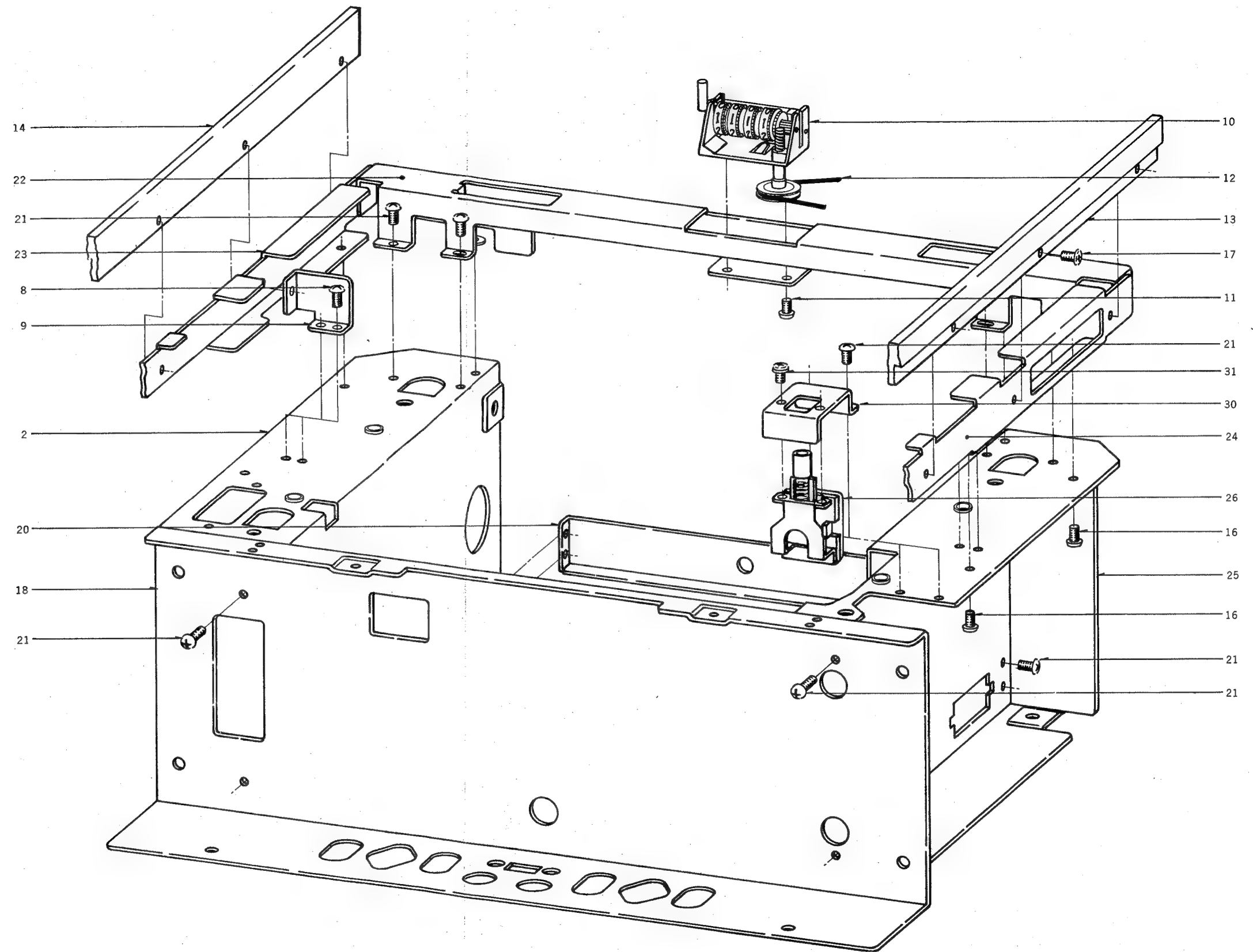


FIG. 7 ILLUSTRATION OF MECHANISM ASSEMBLY BLOCK (II)



MECHANISM ASSEMBLY BLOCK (II)

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
OSC. FRAME BLOCK				
7-1x	BZ475740	OSC. Frame Block Comp.	LF-2	1
7-2	EZ411535	OSC. Frame, w/props	LF-5015	1
7-3x	MH223097	Prop 590	BT-590	2
7-4x	ZW273756	M3 Nut		2
7-5x	BA475751	OSC. P.C. Board Comp. (LF-5210)		1
7-6x	ZW413728	Screw, binding head 3x6, w/washer		2
7-7x	EZ411546	OSC. Shield Plate	LF-5016	1
7-8	ZW200687	Tapping Screw #2 3x6(round)		4
7-9	EZ411491	Sash Reinforcement Part	LF-5018	1

MECHANISM ASSEMBLY BLOCK

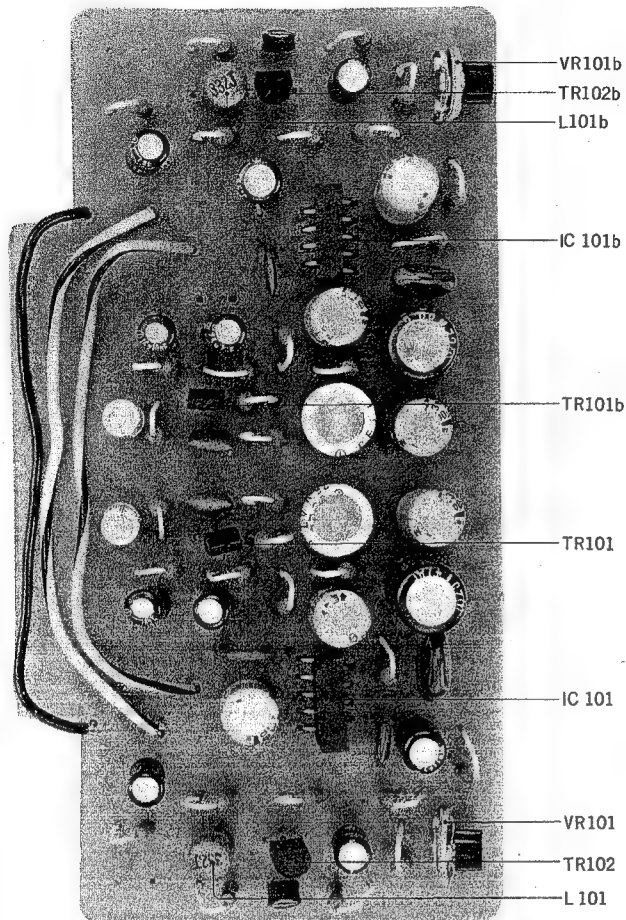
7-10	MC456006	Counter MP-491-23	9-1-3	1
7-11	ZW379405	Iso Screw, binding head 3x6		2
7-12	MB410310	Counter Belt	LF-6037	1
7-13	SP406067	KD Sash (right)	KD-6005	1
7-14	SZ435014	Sash (left)	KD-6005	1
7-15x	SP436083	Sash (L)	LF-6005	2
7-16	ZW413155	Screw, binding head 3x6		10
7-17	ZW413741	Screw, binding head 3x8		6
7-18	EZ411322	Amp. Chassis, w/side	LF-5001	1
7-19x	MZ273295	M-9 Mech. Panel Prop	M9-302	4
7-20	EZ411300	Amp. Supporting Plate	LF-5020	1
7-21	ZW447772	Tapping Screw 3x6(BR)		6
7-22	MZ411311	Counter Mt. Plate	LF-5019	1
7-23	EZ411298	Sash Retaining Plate (left)	LF-5021	1
7-24	EZ413864	Sash Retaining Plate (right)	LF-5021	1
7-25	EZ411445	Power Supply Frame	LF-5012	1
7-26	ES468426	Push Switch UEH-12BFN	25-5-58	1
7-27x	ES479395	Push Switch TV-3 JH5 (CEE)	25-5-62	1
7-28x	ER376413	Spark Quencher U/L 0.033μ+120 500WV	41-1-37	1
7-29x	SK371621	PTA Knob (black)	ED-615	1
7-30	EZ411467	Switch Retaining Part	LF-5013	1
7-31	ZW349288	Iso Screw, binding head 3x5, w/washer		2

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.



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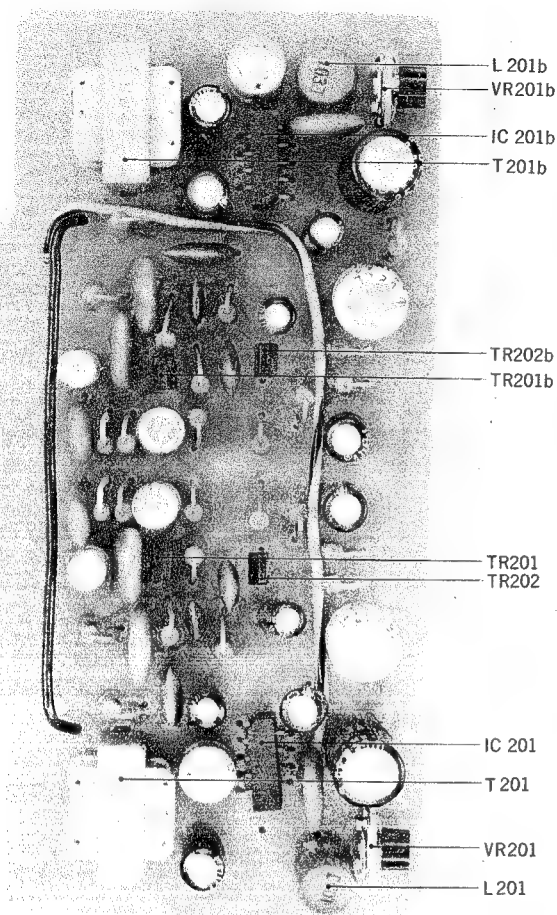
FIG. 9 PHOTO OF
REC. AMP. P.C. BOARD (LF-5213)



REC. AMP. P.C. BOARD (LF-5213) BLOCK

Symbol No.	Part No.	Description	Q'ty
9-1x	BA475694	Rec. Amp. P.C. Board Comp. (LF-5213)	1
9-IC101	EI412413	Line Amp. I.C. LD-3141	2
9-TR101	ET234854	Transistor 2SC458LG(C)	2
9-TR102	ET398845	Transistor 2SC871(E)(F)	2
9-VR101	EV398812	Semi-fixed Volume V10K-5 5k B	2
9-L101	EO243988	Ferri Inductor FL7H 3.3MH(J)	2
Capacitor, Vertical Type			
9-C101	EC432810	Elect. 10 μ F 16WV (noiseless)	2
9-C102	EC290531	VFM 100PF(K) 50WV	2
9-C103	EC450055	Elect. 1 μ F 25WV	2
9-C104	EC220364	Elect. 100 μ F 6.3WV	2
9-C105	EC476965	Elect. 47 μ F 25WV (noiseless)	2
9-C106	EC220678	Elect. 47 μ F 25WV	2
9-C107	EC320051	Elect. 10 μ F 16WV	2
9-C108	EC220364	Elect. 100 μ F 6.3WV	2
9-C109	EC379170	Mylar 0.1 μ F(J) 50WV	2
9-C110	EC220364	Elect. 100 μ F 6.3WV	2
9-C111	EC251087	Mylar 0.022 μ F(K) 50WV	2
9-C112	EC220994	Elect. 10 μ F 25WV	2
9-C113	EC320051	Elect. 10 μ F 16WV	2
9-C115	EC304110	Mylar 0.0015 μ F(K) 50WV	2
9-C117	EC450055	Elect. 1 μ F 25WV	2
Resistor, Stopper Type			
9-R101	ER357570	Carbon RD1/4 150k(J)	2
9-R102	ER349907	Carbon RD1/4 33k(J)	2
9-R103	ER350100	Carbon RD1/4 68k(J)	2
9-R104	ER304402	Carbon RD1/4 470(J)	2
9-R105	ER306887	Carbon RD1/4 15k(J)	2
9-R106	ER212264	Carbon RD1/4 22k(J)	2
9-R108	ER336442	Carbon RD1/4 10k(J)	2
9-R109	ER350100	Carbon RD1/4 68k(J)	2
9-R110	ER212264	Carbon RD1/4 22k(J)	2
9-R111,2	ER212883	Carbon RD1/4 4.7k(J)	4
9-R113	ER346601	Carbon RD1/4 47k(J)	2
9-R114	ER336442	Carbon RD1/4 10k(J)	2
9-R115	ER212883	Carbon RD1/4 4.7k(J)	2
9-R116	ER211465	Carbon RD1/4 1k(J)	2
9-R117	ER213120	Carbon RD1/4 56(J)	2

FIG. 10 PHOTO OF
P.B. AMP. P.C. BOARD (LF-5022)



P.B. AMP. P.C. BOARD (LF-5022) BLOCK

Symbol No.	Part No.	Description	Q'ty
10-1x	BA475705	P.B. AMP. P.C. Board Comp. (LF-5022)	1
10-IC201	EI412413	Line Amp. I.C. LD-3141	2
10-TR201,2	ET234854	Transistor 2SC458LG(C)	4
10-T201	BT247746	Head Phone Trans. N19-228S	2
10-VR201	EV221826	Semi-fixed Volume V10K-5 10k B	2
10-L201	EO244001	Ferri Inductor FL9H 10MH(J)	2
Capacitor, Vertical Type			
10-C201	EC290531	VFM 100PF(K) 50WV	2
10-C202	EC432810	Elect. 10 μ F 16WV(noiseless)	2
10-C203	EC476965	Elect. 47 μ F 25WV(noiseless)	2
10-C204	EC404908	Hi-Q 470PF(K) 50WV	2
10-C205	EC477898	Elect. 47 μ F 6.3WV(noiseless)	2
10-C206	EC290520	VFM 100PF(J) 50WV	2
10-C207	EC329771	Elect. 47 μ F 6.3WV	2
10-C208	EC320051	Elect. 10 μ F 16WV	2
10-C209	EC337487	Hi-Q 470PF(J) 50WV	2
10-C210	EC250841	Mylar 0.01 μ F(J) 50WV	2
10-C211	EC290564	VFM 220PF(K) 50WV	2
10-C212	EC220678	Elect. 47 μ F 25WV	2
10-C213	EC320051	Elect. 10 μ F 16WV	2
10-C214	EC329771	Elect. 47 μ F 6.3WV	2
10-C215	EC329850	VFM 220PF(J) 50WV	2
10-C216	EC220364	Elect. 100 μ F 6.3WV	2
10-C217	EC220994	Elect. 10 μ F 25WV	2
Resistor, Stopper Type			
10-R201	ER362485	Carbon RD1/4 330k(J)	2
10-R202	ER336442	Carbon RD1/4 10k(J)	2
10-R203	ER212681	Carbon RD1/4 330(J)	2
10-R204	ER362485	Carbon RD1/4 330k(J)	2
10-R205	ER357570	Carbon RD1/4 150k(J)	2
10-R206	ER212883	Carbon RD1/4 4.7k(J)	2
10-R207	ER212477	Carbon RD1/4 3.3k(J)	2
10-R208, 9	ER212264	Carbon RD1/4 22k(J)	4
10-R210	ER211858	Carbon RD1/4 12k(J)	2
10-R211	ER380711	Carbon RD1/4 220k(J)	2
10-R212	ER212883	Carbon RD1/4 4.7k(J)	2
10-R213	ER211858	Carbon RD1/4 12k(J)	2

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 11 PHOTO OF
OSC. P.C. BOARD (LF-5210)

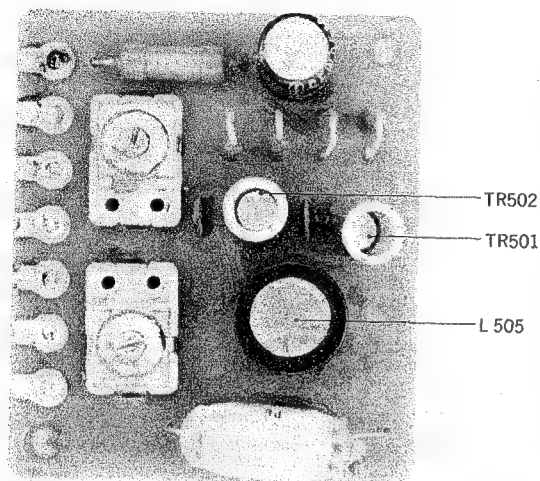
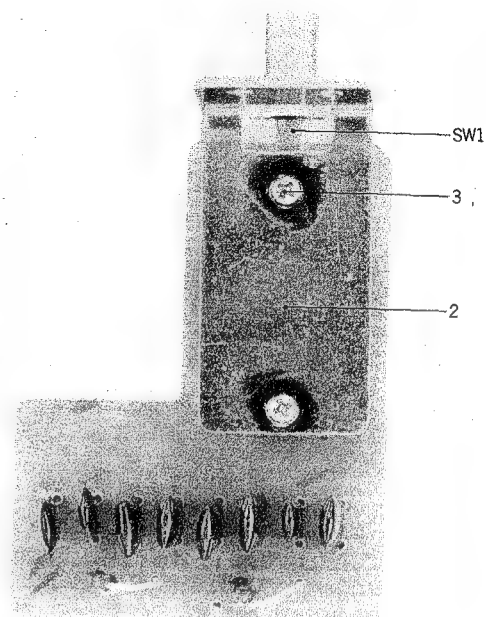


FIG. 12 PHOTO OF
SRT SWITCH P.C. BOARD (LF-5206)



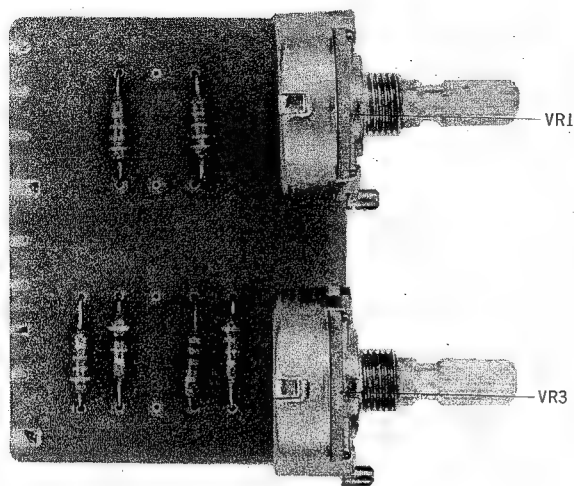
OSC. P.C. BOARD (LF-5210) BLOCK

Symbol No.	Parts No.	Description	Q'ty
11-1x	BA475751	OSC. P.C. Board Comp. (LF-5210)	1
11-TR501, 2	ET399824	Transistor 2SC971(2)(red)	2
11-L505	EO383365	OSC. Coil OT-204	1
Capacitor, Vertical Type			
11-C505, 6	EC398878	Trimmer C-1P-2 50...70PF	2
11-C509	EC383400	Plastic Film 5600PF(J) 500WV	1
11-C510	EC220678	Elect. 47 μ F 25WV	1
11-C511, 2	EC250841	Mylar 0.01 μ F(J) 50WV	2
Resistor, Stopper Type			
11-R501	ER398856	Metal Oxide Film 1W 100(K)	1
11-R502	ER212883	Carbon RD1/4 4.7k(J)	1
11-R503	ER304402	Carbon RD1/4 470(J)	1
11-R504, 5	ER315944	Carbon RD1/4 3.3(J)	2

SRT SWITCH P.C. BOARD (LF-5206) BLOCK

Symbol No.	Parts No.	Description	Q'ty
12-1x	BA475661	SRT Switch P.C. Board Comp. (LF-5206)	1
12-SW1	ES475288	Push Switch UEG-42	1
12-2	EZ475975	SRT Switch Retaining Metal	1
12-3	ZW461935	Screw, round head 2.6x4	2
Capacitor, Vertical Type			
12-C1	EC250841	Mylar 0.01 μ F(J) 50WV	1
12-C2	EC250975	Mylar 0.015 μ F(J) 50WV	1
12-C3	EC368335	Mylar 0.022 μ F(J) 50WV	1
12-C4	EC379157	Mylar 0.033 μ F(J) 50WV	1
12-C5	EC250841	Mylar 0.01 μ F(J) 50WV	1
12-C6	EC250975	Mylar 0.015 μ F(J) 50WV	1
12-C7	EC368335	Mylar 0.022 μ F(J) 50WV	1
12-C8	EC379157	Mylar 0.033 μ F(J) 50WV	1
12-R1, 2	ER212681	Carbon Resistor RD1/4 330(J)	2

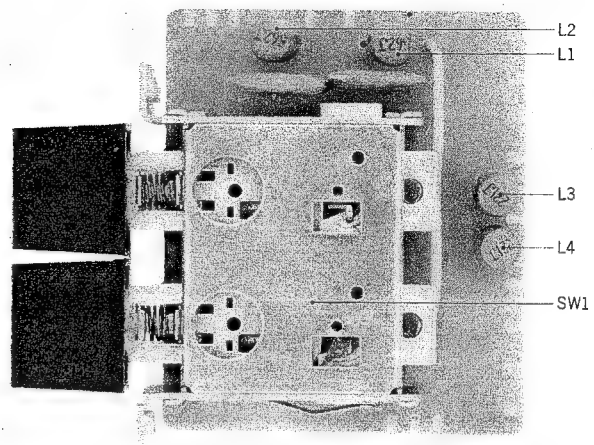
FIG. 13 PHOTO OF
VOLUME P.C. BOARD (LF-5225)



VOLUME P.C. BOARD (LF-5225) BLOCK

Symbol No.	Parts No.	Description	Q'ty
13-1x	BA488542	Volume P.C. Board Comp. (LF-5225)	1
13-VR1, 3	EV488520	Volume V24R 10k A	2
Resistor, Stopper Type			
13-R1	ER346601	Carbon RD1/4 47k(J)	1
13-R2	ER306360	Carbon RD1/4 6.8k(J)	1
13-R21, 22	ER349907	Carbon RD1/4 33k(J)	2
13-R25, 26	ER349907	Carbon RD1/4 33k(J)	2

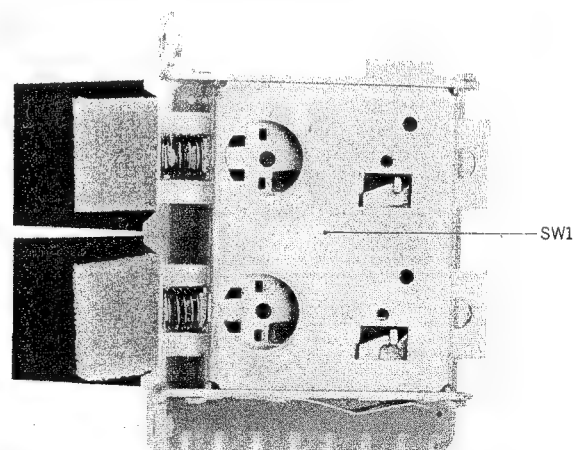
FIG. 14 PHOTO OF TRACK SELECTOR
P.C. BOARD (LF-5211)



TRACK SELECTOR P.C. BOARD (LF-5211) BLOCK

Symbol No.	Parts No.	Description	Q'ty
14-1x	BA475683	Track Selector P.C. Board Comp. (LF-5211)	1
14-SW1	ES411805	Push Switch UM21620C	1
14-L1, 2	EO321254	Ferri Inductor FL7H 5.6MH(J)	2
14-L3, 4	EO346500	Ferri Inductor FL7H 220μH(J)	2
14-C1, 2	EC417464	VFM Capacitor 450PF(J) 50WV	2

FIG. 15 PHOTO OF MONITOR SWITCH
P.C. BOARD (LF-5226)

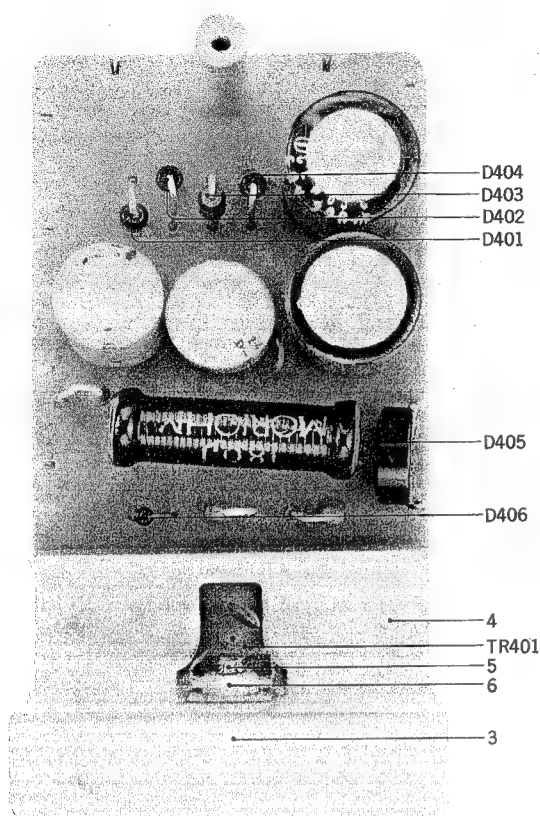


MONITOR SWITCH P.C. BOARD (LF-5226) BLOCK

Symbol No.	Parts No.	Description	Q'ty
15-1x	BA475672	Monitor Switch P.C. Board Comp. (LF-5226)	1
15-SW1	ES245103	Push Switch UM21220J	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 16 PHOTO OF POWER SUPPLY
P.C. BOARD (LF-5208)



**POWER SUPPLY P.C. BOARD
(LF-5208) BLOCK**

Symbol No.	Parts No.	Description	Q'ty
16-1x	BA475738	Power Supply P.C. Board Comp. (LF-5208)	1
16-2x	BA476065	Power Supply P.C. Board Comp. (LF-5208) (Deck)	1
16-3	EZ475334	Heat-sink Plate 1731	1
16-4	ZW447840	Tapping Screw #2 3x8(BR)	2
16-TR401	ET476886	Transistor 2SC1098(L)(M)	1
16-5	ZW413741	Screw, binding head 3x8	1
16-6	ZW273756	M3 Nut	1
16-D401, 2	ED375592	Silicon Diode VO6B	2
16-D403, 4	ED375592	Silicon Diode VO6B	2
16-D405	ED329130	Silicon Diode 10DC-1 (black)	1
16-D406	ED315415	Zener Diode RD-24A (MN)	1
16-7x	EZ411524	P.C. Board Prop	1
16-8x	ZW413223	Screw, binding head 3x5, w/washer	1
Capacitor, Vertical Type			
16-C401, 2	EC337533	Elect. 220 μ F 50WV	2
16-C403, 4	EC313121	Elect. 220 μ F 25WV	2
16-C405	EC250604	Mylar 0.001 μ F(K) 50WV	1
Resistor, Stopper Type			
16-R401	ER211667	Carbon RD1/4 100(J)	1
16-R402	ER413717	Wire-wound 3WL 18(J) (L type)	1
16-R403	ER212883	Carbon RD1/4 4.7k(J)	1
16-R404	ER361642	Carbon RD1/4 47(J)	1

AMP. ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
CONTROL PANEL BLOCK				
17-1x	BZ475648	Control Panel Block Comp.	LF	1
17-2x	BZ475640	Control Panel Block Comp. (Deck)	LF	1
17-3	SP411401	Control Panel	LF-5005	1
17-4	EJ433844	Mic. Jack 2PMJ4	31-2-35	2
17-5x	ER364948	Carbon/R. RD1/4 3.3k(J) (Insu. type)	35-9-5	2
17-6	EJ442078	Mic. Jack 3PMJ4	31-2-36	1
17-7x	ZW272722	M9 Toothed Lock Washer D9.3x13x0.5t		1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

-When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 17 PHOTO OF AMP. ASSEMBLY BLOCK

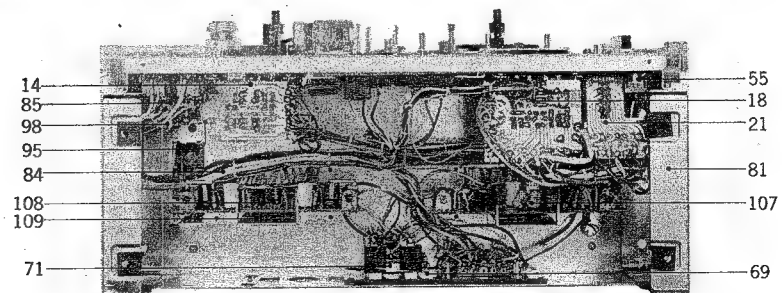
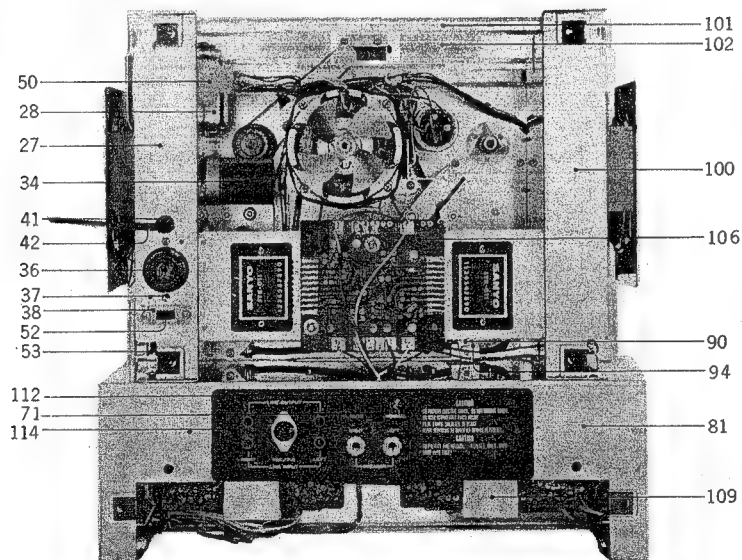
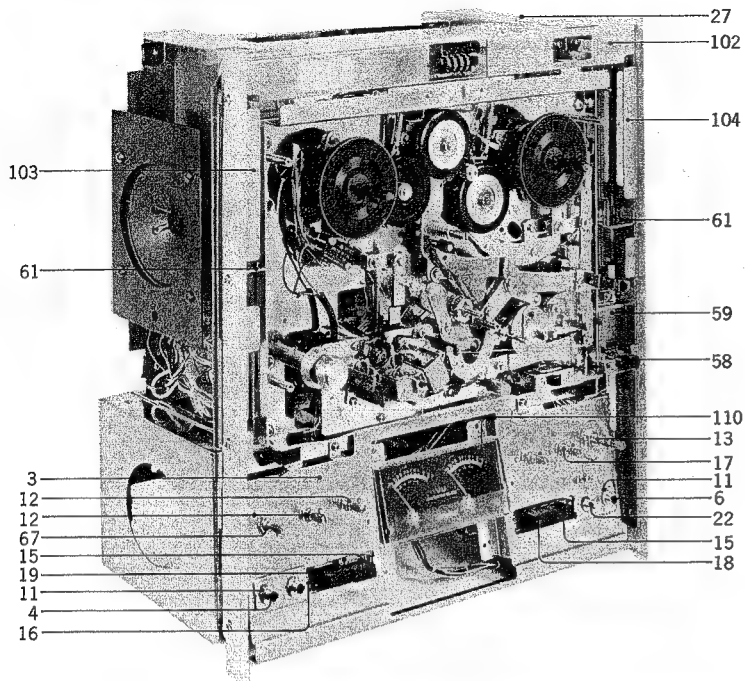
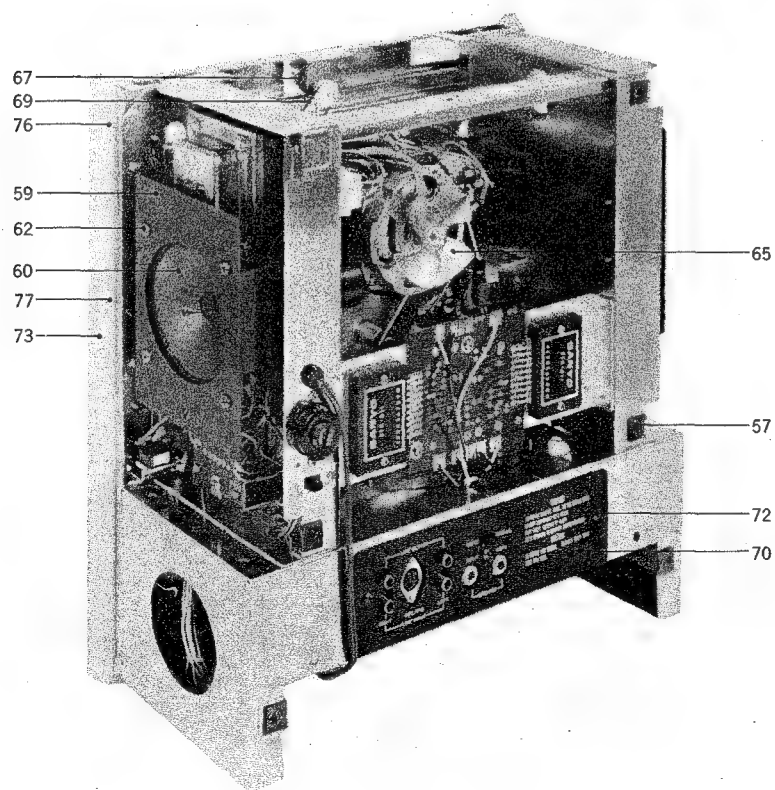


FIG. 18 PHOTO OF FINAL ASSEMBLY BLOCK



FINAL ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty	Ref. No.	Parts No.	Description	Schematic No.	Q'ty
MECH. PANEL BLOCK					18-54x	VM293883	Hinge #1700 (L)	AT-38	2
18-1x	BZ475380	Mech. Panel Block Comp.	LF-2	1	18-55x	ZW476741	M3 Iso Flange Nut (L)		2
18-2x	BZ478923	Mech. Panel Block Comp.			18-56x	BC867161	Leather Case Front Cover		1
		(CEE, CSA)	LF-2	1			(LF-2)		
18-3	SP474985	Mech. Panel A, w/spin plate	LF-6209	1	FINAL ASSEMBLY BLOCK				
18-4x	SP479283	Mech. Panel B, w/spin plate			18-57	ZW290250	U type Speed Nut M4 #1		10
		(CEE, CSA)	LF-6209	1			(large) 6-3-2		
18-5x	SZ410703	Collar, Jack	LF-6041	2	18-58x	ZW290248	U type Speed Nut M4 #1		4
18-6	SZ330895	MR Counter Escutcheon	MR-646	1			(small) 6-3-1		
18-7	SC410624	Head Cover Base	LF-6018	1	18-59	SZ410308	Speaker Mt. Plate	LF-6002	2
18-8x	ZW411671	Screw, oval countersunk head		4	18-60	SS391342	Speaker SK-2187E	29-5-9	2
		2.3x8		4	18-61x	ER374793	Wire-wound/R. 3WL 22(K)		2
18-9x	ZW273666	M2.3 Spring Washer		4			(L type) 35-4-7		
18-10x	ZW273688	M2.3 Nut		4	18-62	ZW411232	Screw, binding head 4x10		8
18-11	SC410646	Head Cover	LF-6019	1	18-63x	ZW413188	M4 Nut		8
18-12	SM474996	Head Cover Panel 1731	LF-6201	1	18-64x	ZW447772	Tapping Screw 3x6(BR)		10
18-13x	ZW201150	Screw, truss head 3x6		2	18-65	MZ256882	Motor Fan D	MH-636	1
AMP. PANEL BLOCK					18-66x	ZW476987	Set Screw, hexagon socket 5x4		1
18-14x	BZ475391	Amp. Panel Block Comp.	LF	1	18-67	MC456006	Counter MP-491-23	9-1-13	1
18-15x	BZ475413	Amp. Panel Block Comp.			18-68x	ZW379405	Iso Screw, binding head 3x6		2
		(Deck)	LF	1	18-69	MB410310	Counter Belt	LF-6037	1
18-16	SP475007	Amp. Panel	LF-6006	1	18-70	SP475187	Back Panel C	LF-6204	1
18-17x	SP476897	Amp. Panel (D)	LF-6006	1	18-71x	SP475198	Back Panel D (Deck)	LF-6204	1
18-18	SM475018	Panel Mask (large)	LF-6211	1	18-72	ZW201150	Screw, truss head 3x6		3
18-19	SM475020	Panel Mask (small)	LF-6202	1	18-73	SP406067	KD Sash (right)	KD-6005	1
18-20	SM475042	Panel Mask A (right)	LF-6212	1	18-74	SZ435014	Sash (left)	KD-6005	1
18-21x	SM475031	Panel Mask B (right) (D)	LF-6212	1	18-75x	SP436083	Sash (L)	LF-6005	2
18-22	SZ410580	Amp. Panel Sash A	LF-6013	1	18-76	ZW413155	Screw, binding head 3x6		6
18-23	SZ410591	Amp. Panel Sash B	LF-6014	1	18-77	ZW413741	Screw, binding head 3x8		2
CASE BLOCK					18-78x	SZ413987	Mech. Frame Retaining Metal	LF-6055	1
18-24	BC475457	Wood Case Block Comp.	LF-2W	1	18-79x	SZ410321	Amp. Panel Retaining Metal	LF-6001	2
18-25x	BC475593	Leather Case Block Comp.	LF-2L	1	18-80x	ZW447805	Tapping Screw #2 3x12(BR)		2
18-26x	BC492388	Wood Case Block Comp.			18-81x	SZ377190	LM Rubber Foot	LM-404	4
		(Deck)	LF-2D	1	18-82x	SZ476875	Cord Angle B Comp. (L)	LF-6214	2
18-27x	SE447873	Upper Anti-warping Part	LF-4005	1	18-83x	SZ327442	Cord Angle B (L)	SK-405	2
18-28x	ZW201183	Screw, truss head 3x8		14	18-84x	SZ476728	M9 Cord Cover (L)	M9-435	2
18-29x	WM441505	Anti Warping Angle	KF-4002	2	18-85x	ZW476730	Screw, truss head 3x12 (L)		2
18-30x	ES325956	RD Corner Reinforcement			18-86	SK463105	Pinch Roller Cap, w/screw	LF-6036	1
		Angle	RD-417	2	18-87	MR411647	Pinch Roller (LF)	LF-1003	1
18-31x	ZW448187	Wood Screw, countersunk head 3x8		4	18-88	SK475097	Knob A Comp.	LE-6012	1
18-32x	SZ382217	Fan Grill	RD-A402	1	18-89	SK488755	Amp. Knob B Comp.	LF-6215	1
18-33x	ZW324448	Tapping Screw #1		3	18-90	SK475154	Amp. Knob Comp.	LF-6206	5
		3x10(truss)		3	18-91x	ZW260166	Washer (Nylon)		2
18-34	SZ382228	Speaker Grill	RD-A403	2			D6.2x13x0.125t		
18-35	ZW383872	Screw, truss head 3x13, without groove		8	18-92	SK476684	Mech. Knob	LE-6018	2
18-36x	ZW273756	M3 Nut		8	18-93x	EF304626	Fuse ST-4 1A	39-1-28	1
18-37	SZ316620	MR Square Foot	MR-402	2	18-94	SM475053	Name Plate 1731W	LF-6203	1
18-38x	ZW413886	Screw, countersunk head 4x15		4	18-95x	SM475064	Name Plate (L)	LF-6203	1
18-39x	ZW479294	Washer (SPC)D4.2x10x0.8t		4	18-96x	SM475075	Name Plate (D)	LF-6203	1
18-40x	SZ218856	Case Shield	RD-410	1	18-97x	EF304626	Fuse ST-4 1A	39-1-28	1
18-41x	VM413144	Handle Reinforcement Metal		1	18-98x	EF338387	Fuse ST-2 1.5A	39-1-26	1
		(L) LF-4004		1	18-99x	EF277402	Fuse ST-2 1A (D)	39-1-26	1
18-42x	SZ293477	Vinyl Handle #1630 (L)		1					
18-43x	SZ324303	Handle Metal Fitting #1630 (L)		2					
18-44x	SZ293455	Handle Metal Fitting Cover #1630 (L)		2					
18-45x	ZW479305	Screw, countersunk head 4x20 (L)		2					
18-46x	SZ237993	Hooking Holder B (L)	100737	2					
18-47x	SZ208271	Holder Metal Supporting Plate (L)	CD-64	2					
18-48x	ZW203027	Screw, oval countersunk head 3x16 (L)		2					
18-49x	ZW231715	Claw Frame Fixing Nut (L)	7-1-7	6					
18-50x	ZW203218	Wood Screw, round head 2.7x10 (L)		6					
18-51x	SZ304964	Hooking #1700 (L)	AT-37	2					
18-52x	ZW202375	Screw, round head 3x10 (L)		7					
18-53x	ZW231704	Claw Hinge Nut (L)	7-1-8	4					

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BA475661	17-21	EC290520	10-C206	ER211858	10-R210	EZ246936	17-44x	MR251460	2-12
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BA475738	17-53	EC320051	9-C107	ER212883	10-R206	EZ411300	17-101	MS245463	6-22
BA475751	7-5x	EC320051	9-C113	ER212883	10-R212	EZ411322	7-18	MS255600	2-6
BA475751	11-1x	EC320051	10-C208	ER212883	11-R502	EZ411322	17-81	MS257051	6-10
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BA475773	8-8x	EC329850	10-C215	ER213715	17-74x	EZ411445	7-25	MS411592	4-3
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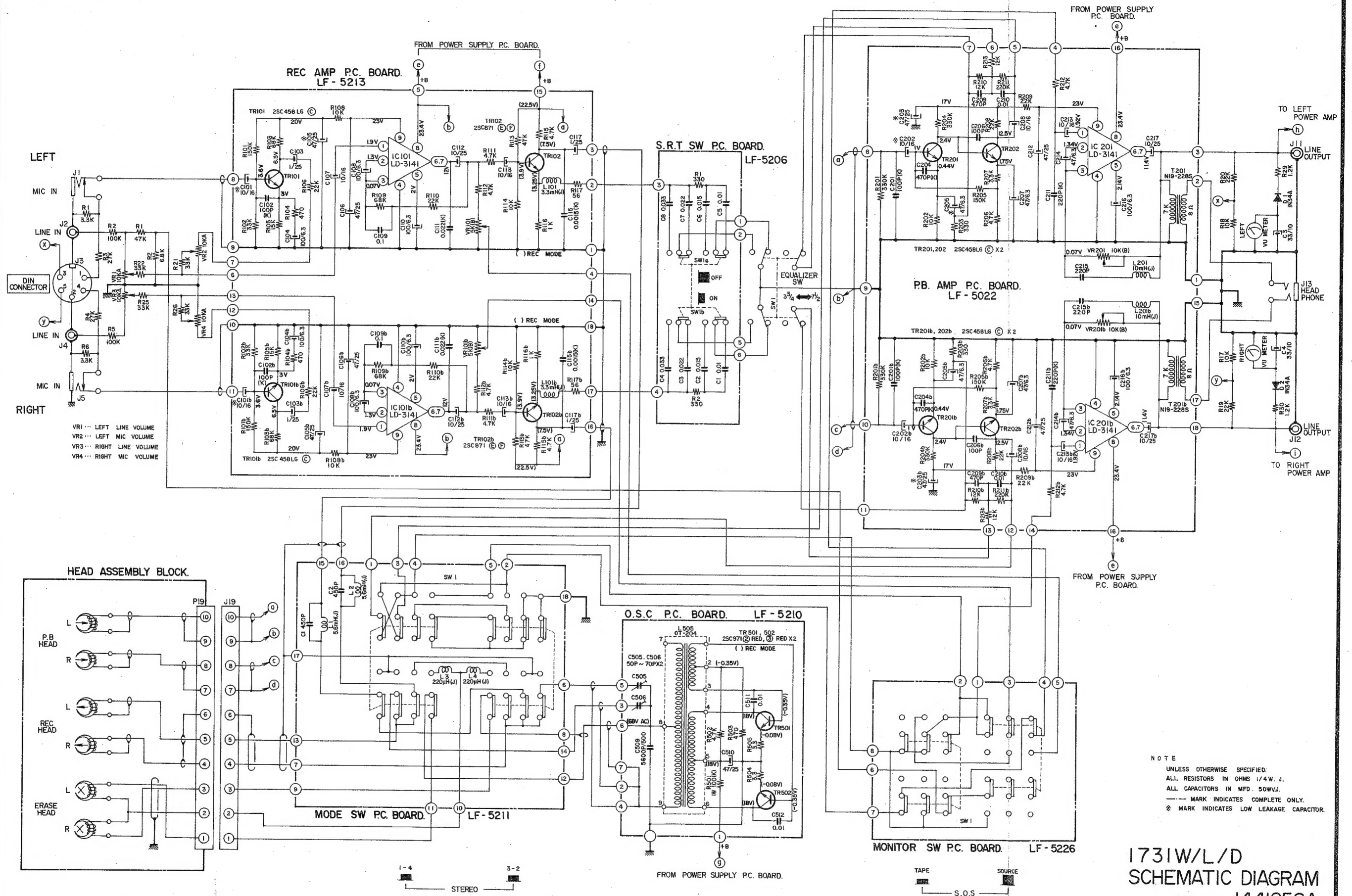
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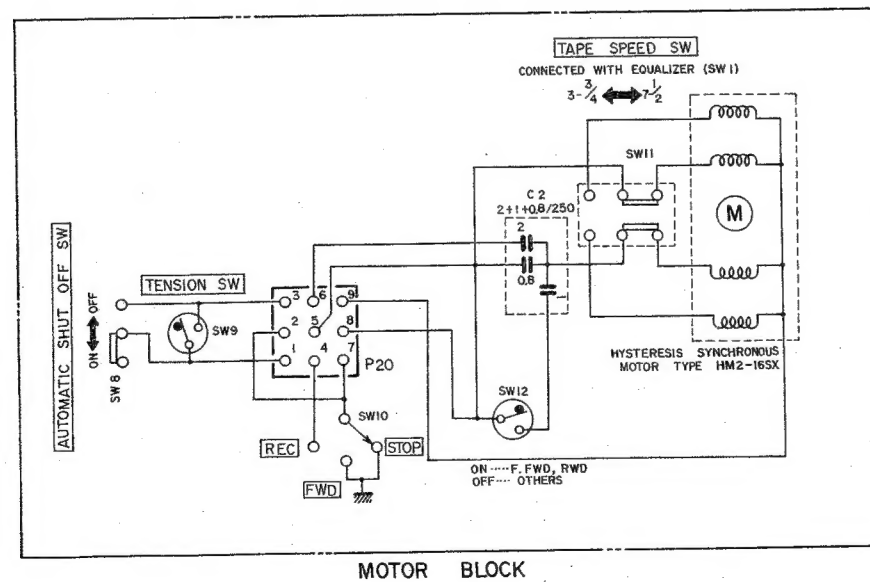
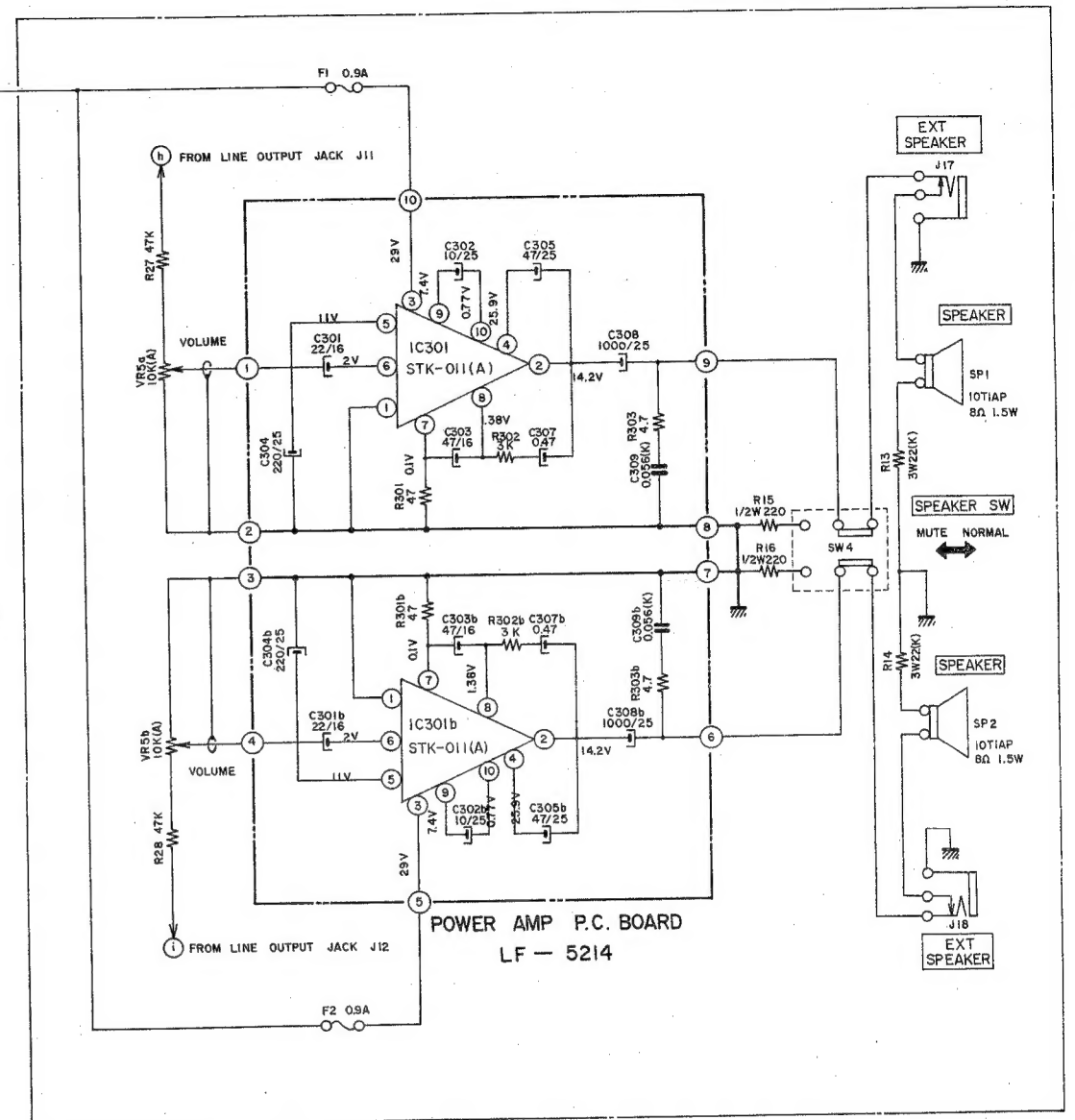
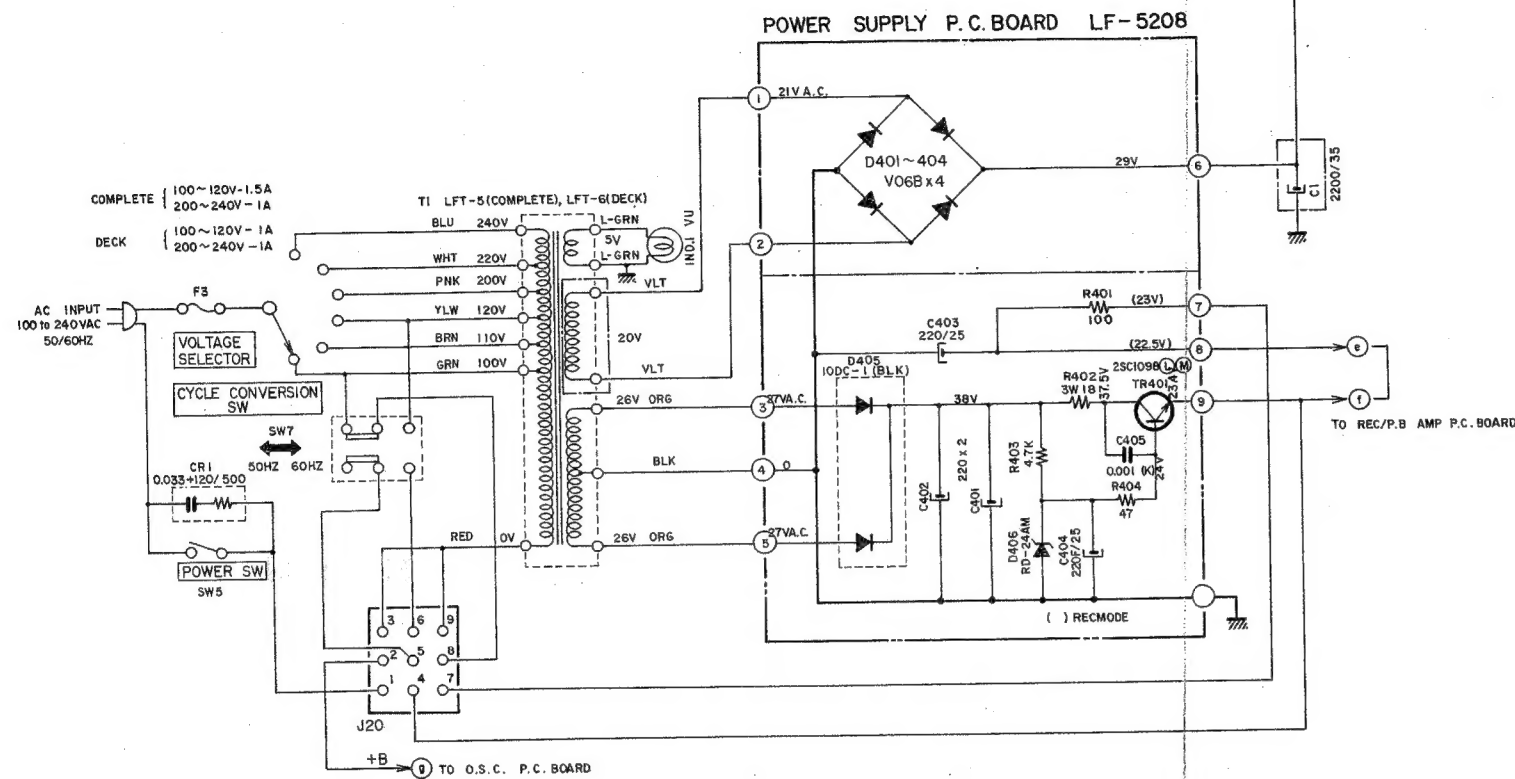
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SK488755	18-89	ZW201150	18-72	ZW349288	7-31	ZW447805	18-80x		
SM474996	18-12	ZW201183	18-28x	ZW349288	17-60x	ZW447840	16-4		
SM475018	18-18	ZW201778	5-9	ZW373577	4-5x	ZW448187	18-31x		
SM475020	18-19	ZW202083	5-4x	ZW376391	6-65	ZW460440	1-19x		
SM475031	18-21x	ZW202230	17-89x	ZW376391	6-101x	ZW461935	12-3		
SM475042	18-20	ZW202375	18-52x	ZW376481	17-10x	ZW462835	6-33x		
SM475053	18-94	ZW203027	18-48x	ZW379405	6-44x	ZW462846	6-34x		
SM475064	18-95x	ZW203218	18-50x	ZW379405	7-11	ZW465592	17-9x		
SM475075	18-96x	ZW217102	6-73	ZW379405	17-37	ZW468527	1-26		
SM511402	17-66x	ZW217877	5-17	ZW379405	18-68x	ZW476730	18-85x		
SP406067	7-13	ZW217877	6-116	ZW383872	18-35	ZW476741	18-55x		
SP406067	18-73	ZW222388	3-13x	ZW391680	17-11	ZW476987	3-22		
SP411401	17-3	ZW223233	6-104	ZW392681	4-22	ZW476987	18-66x		
SP436083	7-15x	ZW231693	2-23	ZW393085	4-19	ZW477876	1-8x		
SP436083	18-75x	ZW231704	18-53x	ZW393232	4-24	ZW477876	1-14x		
SP474985	18-3	ZW231715	18-49x	ZW393726	6-38x	ZW479294	18-39x		
SP475007	18-16	ZW231805	6-4	ZW396437	6-114x	ZW479305	18-45x		
SP475187	17-112	ZW244574	4-18	ZW411232	18-62	ZW803193	17-97x		
SP475187	18-70	ZW244710	4-8	ZW411671	18-8x				
SP475198	17-113x	ZW259795	6-120x	ZW413155	1-28x				
SP475198	18-71x	ZW259885	3-14x	ZW413155	6-45x				
SP476897	18-17x	ZW259918	6-91x	ZW413155	7-16				
SP479283	18-4x	ZW259942	6-80x	ZW413155	17-105x				
SS391342	18-60	ZW260021	2-15	ZW413155	18-76				
SZ208271	18-47x	ZW260021	2-24	ZW413166	6-42				
SZ218856	18-40x	ZW260054	2-26	ZW413188	5-19				
SZ226282	6-131x	ZW260054	3-31x	ZW413188	6-13x				
SZ237993	18-46x	ZW260065	2-47	ZW413188	6-110				
SZ293455	18-44x	ZW260076	6-63x	ZW413188	17-33x				
SZ293477	18-42x	ZW260087	6-87x	ZW413188	18-63x				
SZ304964	18-51x	ZW260087	6-99x	ZW413190	6-48x				
SZ316620	18-37	ZW260098	2-16x	ZW413201	3-29				
SZ324303	18-43x	ZW260098	2-27	ZW413201	5-22				
SZ327442	18-83x	ZW260133	5-5x	ZW413201	5-25x				
SZ330895	18-6	ZW260166	5-18x	ZW413201	6-16x				

SECTION 3

SCHEMATIC DIAGRAM

1731 W/L/D SCHEMATIC DIAGRAM





NOTE

UNLESS OTHERWISE SPECIFIED	
ALL RESISTORS IN OHMS	1/4W.J
ALL CAPACITORS IN MFD	50VW.J
—— MARK INDICATES	COMPLETE ONLY
✕ MARK INDICATES	LOW LEAKAGE CAPACITOR
POWER TRANSFORMER	AND MOTOR BLOCK
THIS IS DIFFERENT	ACCORDING TO AREA